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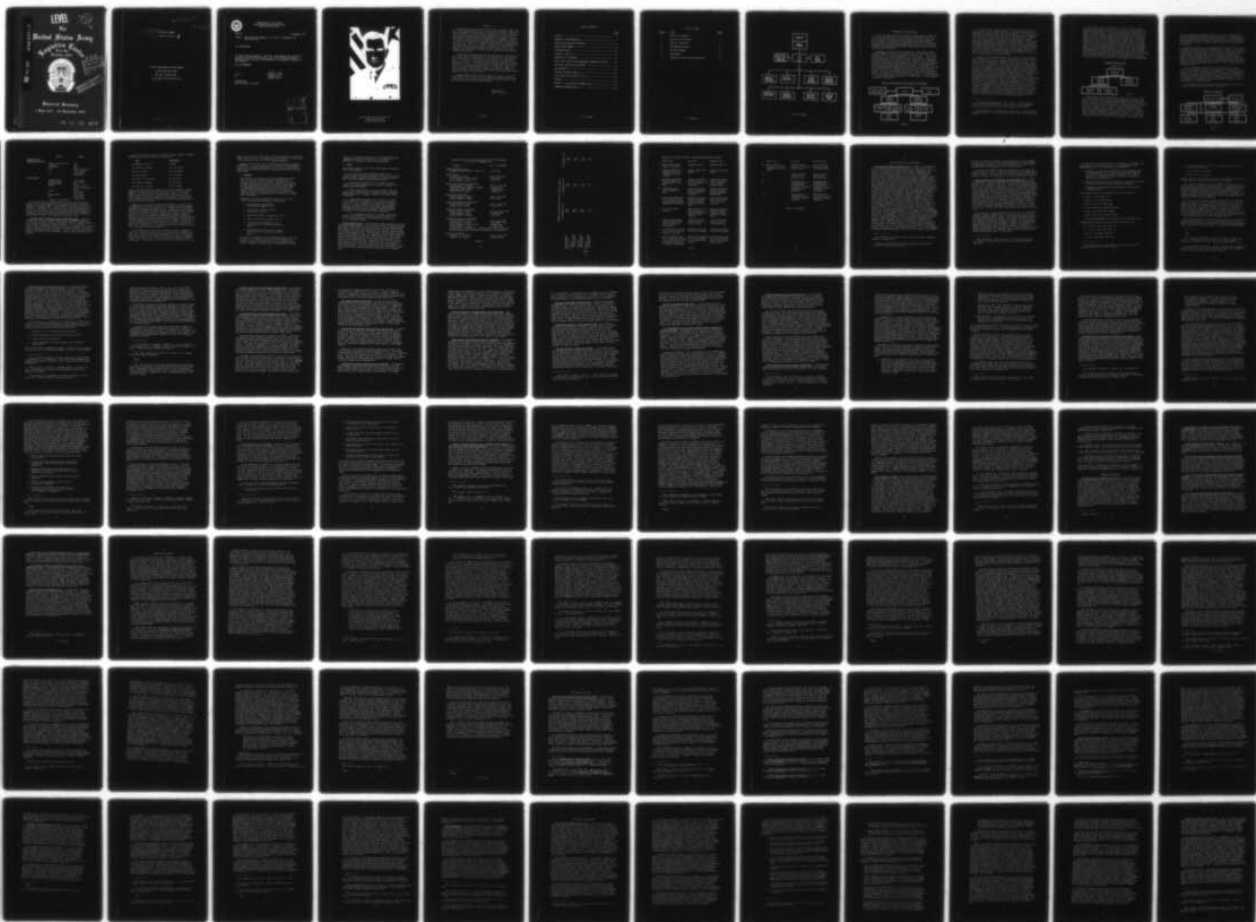
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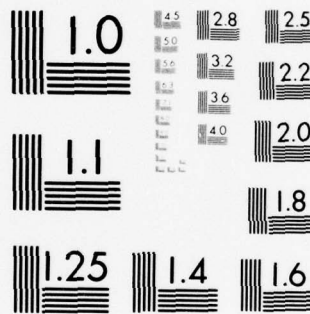
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Logistics Center  
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Historical Summary

1 July 1974 - 30 September 1976

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LOGC HISTORICAL SUMMARY.  
(RCS-HIS-6 (R2)).

US ARMY TRAINING AND DOCTRINE COMMAND  
US ARMY LOGISTICS CENTER  
FORT LEE, VIRGINIA 23801

1 JULY 1974 TO 30 SEPTEMBER 1976.

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DEPARTMENT OF THE ARMY  
UNITED STATES ARMY LOGISTICS CENTER  
FORT LEE, VIRGINIA 23801

ATCL-CS

16 November 1978

SUBJECT: LOGC Historical Summary, 1 July 1974 - 30 September 1976  
(RCS-HIS-6 (R2))

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MAJOR GENERAL ERWIN M. GRAHAM, JR.  
Commanding General  
US Army Logistics Center

## PREFACE

This history of the activities of the US Army Logistics Center from July 1974 through September 1976 is functional in approach. There is no one chapter devoted to the history of a specific directorate, although several chapters, by virtue of their subject matter, deal principally with projects and studies which would naturally be located in a certain directorate. The intention of this approach is to emphasize certain areas which--from the historian's vantage point--seem most significant in terms of the dedication of resources and/or potential contribution to Army logistics. There is, of course, room for honest disagreement; but the final answer lies in the future. An additional reason for this approach is to illustrate the manner in which certain projects and studies cross directorate lines and draw on the expertise of personnel throughout the Center.

Some projects and studies have not been described in this history at all. Again, this is no denigration of the work of those involved with these particular activities. What was significant in one quarter or even one year might, on reflection and in light of succeeding actions, appear to be less so. The Logistics Center handles hundreds of projects and studies a year, and no history could cover them all. What is discussed in this present volume, however, is a substantial number of activities which, taken together, suggest the large contribution the Logistics Center is making to improving combat support and combat service support for the Army in the field.

Unless otherwise cited in the footnotes, this history is based on directorate historical feeder reports, quarterly Reviews and Analyses, and briefings. This material is available for further research in the Historian's Office, US Army Logistics Center.

Martin Reuss  
Command Historian

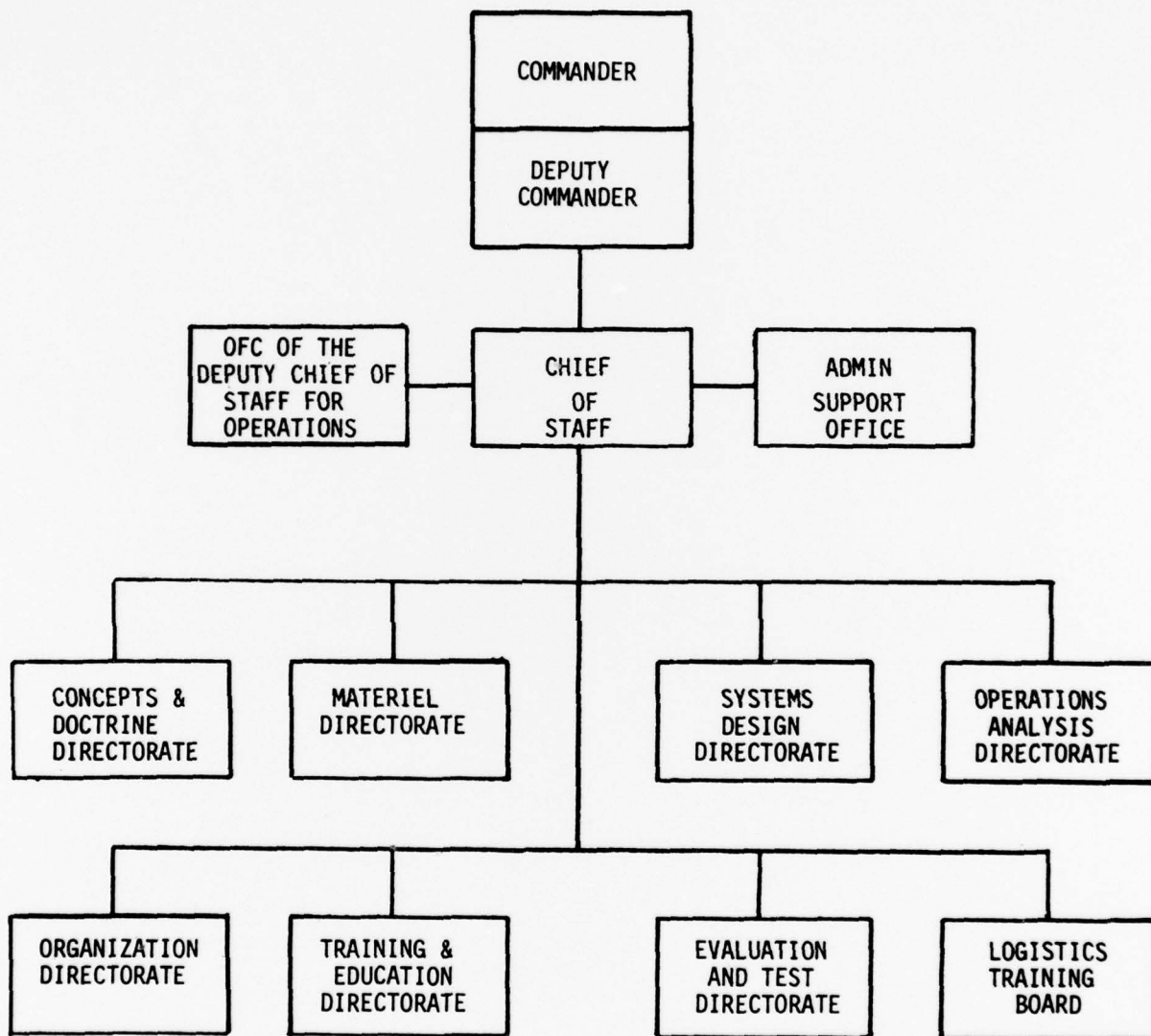


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## MANAGEMENT AND ORGANIZATION

If the first year of operations for the US Army Logistics Center was one devoted to establishing a firm foundation upon which to grow, the next two and one-half years were used to build a solid structure upon that foundation. Organizational requirements were defined and the Center's exact relationship with Army elements both within and without the parent Training and Doctrine Command were clarified. In some cases, management was restructured in order to provide more internal coordination and greater efficiency.

Organization. Perhaps the most significant organizational change within the Logistics Center was the reorganization of the Office of the Assistant Chief of Staff for Operations on 21 April 1975. Prior to this reorganization, the office was divided into five branches: Operations, Program Management, Liaison Officer, Visual Information, and Management Information and Review and Analysis Branch. From the time the Logistics Center was established, there had been various functional changes within these branches. An important one had taken place on 3 September 1974 when Program Management assumed from the Concepts and Doctrine Directorate the responsibility for directing the Logistics Center Study Program. However, the April 1975 reorganization was far more drastic than earlier changes. The name of the office was changed as well as its structure. The new name was Deputy Chief of Staff for Operations. The most important new function which DCSOPS assumed was the Budget Office. The reorganized structure is shown below:

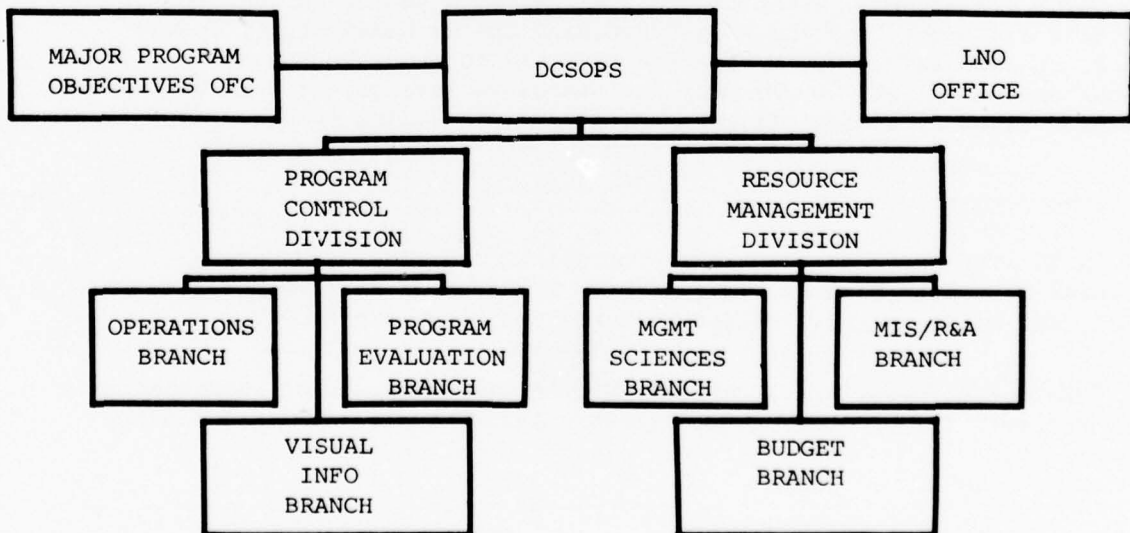
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS

Figure 1

On 6 October 1975, several personnel changes were directed by the Chief of Staff, Colonel James H. Carroll, Jr., which affected both the Administrative Support Office (ASO) and the ODCSOPS. The responsibility for military and civilian personnel matters was transferred from ASO to the Office of the Deputy Chief of Staff. Also, effective 20 October 1975, the position of Military Chief of the Administrative Support Office was transferred to the Logistics Training Board, and the position of Administrative Officer (Deputy Director) was changed to Chief, ASO. Both these changes had been envisioned in the April 1975 reorganization but had been delayed until October.<sup>1</sup> As a result, Lieutenant Colonel J. B. Bickley, formerly Chief of the Administrative Support Office, became head of the Training Developments Branch at the Logistics Training Board; and Mr. Calvin C. Jones, the Deputy Chief, became the civilian Chief of the Administrative Support Office.

In April 1974, a manpower survey of the Logistics Center determined that a Word Processing Center was both practical and feasible. Major General Erwin M. Graham, Jr., Commander of the Logistics Center, and Colonel Francis E. Mendenhall, Chief of Staff, agreed and directed that such a center be established. Plans were approved by the Department of the Army in January 1975; and, by the spring of that year, some personnel spaces and equipment had been provided. However, without additional equipment and personnel, the Word Processing Center could not become operational, and FY 75 funds previously designated for the Word Processing Center had meanwhile been reallocated to other activities. Further problems ensued towards the end of the year when the IBM dial input equipment which had been delivered in mid-November could not be installed because the links required to connect the equipment to the telephone system could not be located. After repeated efforts to locate the links had failed, it was decided to terminate the IBM contract. On 12 March 1976, the Department of the Army approved acquiring another brand of equipment. Thereupon, a contract was signed with Lanier for the rental of their equipment; and the Word Processing Center became fully operational in June 1976. The center was expected to save the Logistics Center around \$83,000.00 per year in intangible savings, as a result of the time saved by action officers using word processing services.<sup>2</sup>

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<sup>1</sup> MFR, ATCL-DRS, MAJ Stephen T. Christian, Jr., Chief, Management Sciences Branch, 3 November 1975, subj: Transfer of Staff Responsibility for Military and Civilian Personnel Matters within LOGC.

<sup>2</sup> Draft MFR (never sent), ATCL-R, Mr. Calvin Jones, Chief, Administrative Support Office, n.d. (about February 1975), subj: Word Processing Center.

Two new directorates were created in 1975. On 24 July, Major General Graham approved a proposal from the Deputy Chief of Staff for Operations that elements of the LOGEX Directorate be combined with the Logistics Training Board. This reorganization became effective on 1 August. The new expanded Logistics Training Board (LTB) retained most of the functions of the old Logistics Exercise Division in LOGEX and added a nucleus of training experts from the former LTB. The LOGEX Directorate ceased to be an organizational element within the Center. The Director's Office and the Logistics Exercise Division were merged with the Logistics Training Board to form the new Logistics Training Board. The Logistics Exercise Division became known as the Training Exercise Division and was divided into two branches. The old Support Branch became part of the new Logistics Branch. This reorganization concentrated in one directorate the personnel responsible for the development of training assistance and exercises for active Army and Army Reserve logistics units. Colonel Ray G. Rennebaum became the Director of the new LTB. The structure of the new organization is shown below:

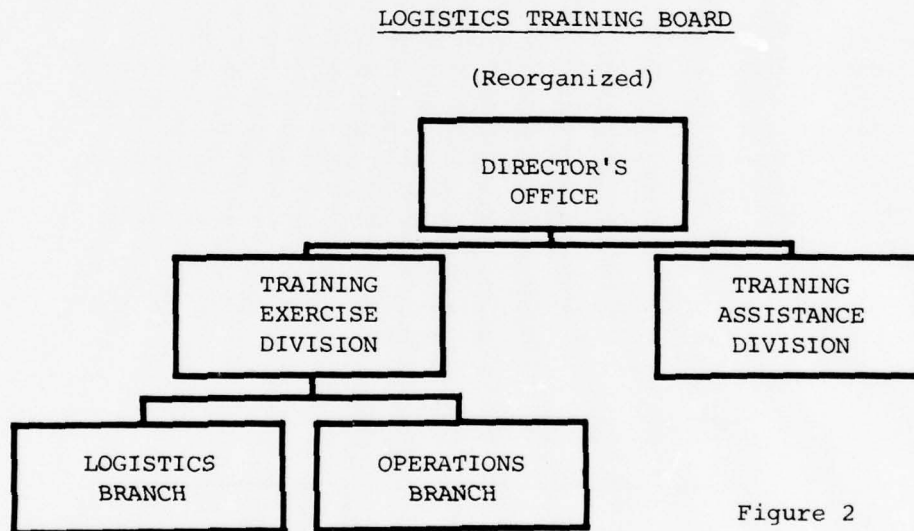


Figure 2

There were two factors that helped catalyze the decision to create the Evaluation and Test Directorate. The Army Materiel Command Test Boards at its Test and Evaluation Command (TECOM), Aberdeen Proving Ground, Maryland, were assimilated by the Training and Doctrine Command. Also, an increasing Army-wide emphasis on field experimentation was occurring. In particular, the use of Scenario Oriented Recurring Evaluation (SCORES) was encouraged to research and identify combat service support requirements. Since the Logistics Center is the functional logistics integrating organization for TRADOC, it inherited a number of TECOM Test Board missions and functions. At the same time, new logistics doctrines required the development and testing of new

logistics equipment, including such items as cranes, transportation craft, and container handling equipment. Therefore, on 11 August 1975, General Graham approved a DCSOPS recommendation for the establishment of an Evaluation and Test Directorate to serve as the locus for all testing matters within the Center. Colonel George T. Morris, Jr., became the new Director.

The effective date of the reorganization was 25 August 1975. The Evaluation & Test Directorate was composed of an Office of the Director (3 personnel) and two divisions. Force Analysis (17 personnel) and Test (14 personnel). The Director's Office was constituted from the TDA spaces in the former Test and Evaluation Division of the Materiel Directorate and the former Office of the Chairman, Logistics Training Board. The Force Analysis Division was established from the TDA spaces formerly in the Exercise Evaluation Division, LOGEX Directorate; and the Test Division was established using TDA spaces from the former Test and Evaluation Division.

The above mentioned organizational structure remained in effect until the Directorate's Quarterly Technical Review in April 1976. At the Technical Review, the Director recommended to the Commander that the directorate be organized with an Office of the Director (3 personnel) and three divisions: Force Analysis (16 personnel), Exercise Evaluation (7 personnel), and Test Design and Evaluation (9 personnel), for a requirement of 35 personnel. The recommended organizational structure was approved by the LOGC Commander.

The creation of the Test and Evaluation Directorate resulted in the following restructuring of the Materiel Directorate:

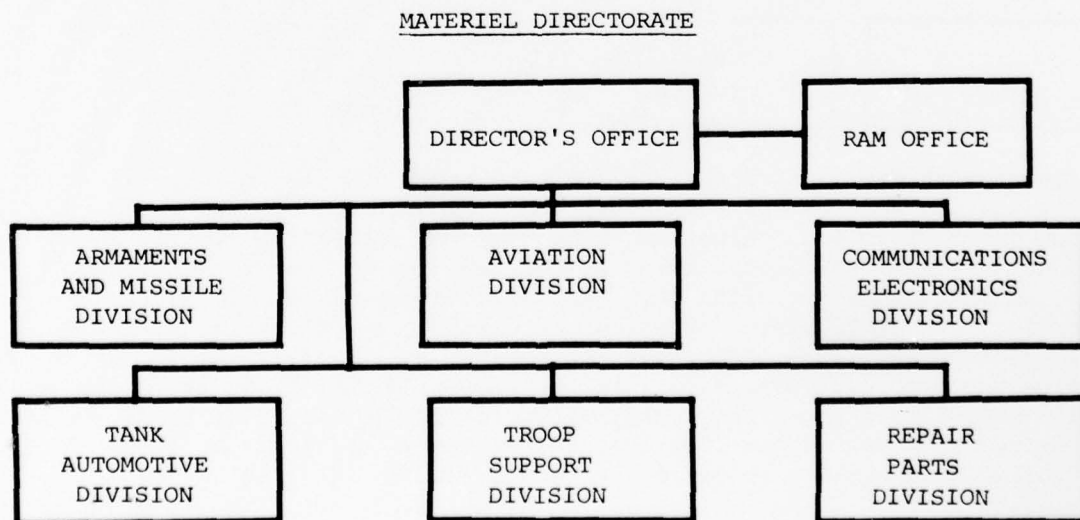


Figure 3



Integration with other logistics activities. At the same time that the Logistics Center was refining its own organizational structure, it was busy clarifying its relationship with associated logistics oriented schools. On 18 September 1974, TRADOC Headquarters issued a directive which delineated the role of the Logistics Center and the logistics oriented schools in the materiel acquisition process. The document, which was further refined in the next year, is an important one and therefore is quoted at some length:<sup>3</sup>

The Logistics Center is tasked with the responsibility for developing, testing, integrating and disseminating information on logistics doctrine and systems. In addition, the Logistics Center has been designated as the TRADOC element having primary responsibility for Reliability, Availability, and Maintainability (RAM). The Logistics Center has management responsibility within TRADOC for integrated logistics support planning associated with new materiel. This responsibility includes the aspects of maintenance at direct support and general support level, retail supply (including basic item and repair parts supply), and user interests of transportability and handling for the materiel item/system. A further included task is insuring the accomplishment of all user responsibilities for developing and providing support type items and systems.

The logistics oriented schools maintain the expertise to support the Logistics Center in the accomplishment of its logistics support mission for new materiel. This support includes working directly with TRADOC proponent schools in the development of RAM requirements, the establishment of failure definitions and scoring criteria, analysis and testing of logistics support concepts, IPR participation concerning logistics matters, and the performance of the full range of combat development tasks for support items and systems. The logistics oriented schools in conjunction with the Logistics Center determine and evaluate the logistics support implication of proposed materiel requirements in coordination with the TRADOC user proponent school. This includes the aspects of maintenance at direct support/general support level and retail supply (both basic item and repair parts supply). The principal logistics implications are the inherent supportability and burdens inferred by proposed operational performance characteristics and the anticipated operational availability for the new materiel item or system. Normally, the appropriate commodity oriented logistics school will be the action element for the Logistics Center and will perform the above tasks in coordination with the TRADOC user proponent school.

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<sup>3</sup> MFR, ATCD-PM-S, 18 September 1974, subj: Role of the Logistics Center (LOGC) and Logistics Oriented Schools in the Materiel Acquisition Process.

The Center became the executive agent for TRADOC in all matters pertaining to RAM. As such, it is the activity which is responsible for the review and approval of the content and proper statement of RAM criteria in requirements documentation, test plans, and test reports. The Logistics Center is also responsible for providing technical RAM assistance to all TRADOC combat development activities. These responsibilities require a continuing RAM effort in all materiel commodity areas (Armament and Missiles, Aviation, Communication-Electronics, Tank-Automotive, and Troop Support). Listed below are representative projects in each commodity area which required RAM support during FY 1976. The technical assistance may also require the full-time effort of a RAM engineer or project officer on a single special project/task force/study group. The effort provided by the RAM Office on the Dragon OT III A is an example of this.

	<u>System</u>	<u>Action</u>
<u>Armaments and Missiles:</u>	Laser Locator Designator	Operational Issues/ Test Criteria
	Detonating Devices	LR
	DRAGON	OT III A (Full-time, TDY)
	ROLAND	IEP, DT III Plan
	SAM-D (Patriot)	RAM Evaluation
	CLGP	Scoring Criteria
<u>Aviation:</u>	UTTAS	OT III Test Criteria
	AAH/ASH	R Requirements
	TOW-COBRA	CTP RAM Evaluation
<u>Communications-Electronics:</u>	FIEPSS	ROC
	Radiacmeter	DT II Test Plan
	Interim Facsimile	LR
	TACSATCOM	OT II
	TRIT	ROC
	MSE	JOR
	C-HET	ROC
	High Mobility Veh	LOA
	BART	Operational Issues
	Combat Support Veh	Determine RAM Requirements

Figure 4

	<u>System</u>	<u>Action</u>
<u>Communications-</u>		
<u>Electronics (Cont'd):</u>		
	Small Unit Support Veh	LOA
	Bushmaster	CTP
	Armored Car	ROC
	XM-1	RAM and Durability
		Test Planning
	TTS	RAM Concept
		Formulation
<u>Troop Support:</u>		
	Generator Sets	DT III Plan
	Multileg Tanker	DT II Report,
	Mooring System	IPR
	FAMECE	OTP-OT II, TDP-
		DT II, Reliability
		Study
	LACV-30	OT II Plan,
		DT II Plan
	Ribbon Bridge	DT III Report
	UET	Check Test,
		Scoring Conf

Figure 4 (Continued)

To more effectively integrate logistics support planning between Logistics Center directorates and the logistics oriented schools, an Integrated Logistics Support (ILS) management office was established in ODCSOPS on 12 November 1975. The office was to be staffed by one 04 and one 03. The mission of the office was to "manage those aspects of the ILS concept that are applied to systems/materiel items throughout the materiel acquisition cycle consistent with the Center's mission of representing the Army in the field and installation users."

Logistics Center Orientation for Selected Logisticians. During his October 1975 visit to the LOGC, General DePuy, the TRADOC Commander, directed that the LOGC initiate orientation briefings for newly assigned G-4s, DCSLOGs, and Support Command commanders. In late November, General Graham recommended to General DePuy that we initiate the orientation program with Support Brigade and Support Command commanders since these types of individuals become intimately involved in the functional logistics systems, more so than G-4s and DCSLOGs. General DePuy agreed with this proposal.

The following seven officers, scheduled to assume command of support commands, have visited the LOGC for orientations:

<u>NAME</u>	<u>ORGANIZATION</u>
BG Sampson H. Bass, Jr.	V COSCOM
COL Charles A. Bullock	101st Inf DISCOM
COL Leo A. Brooks	13th Inf DISCOM
COL Glen Mitchell	1st Inf DISCOM
COL Charles C. Partridge	2d Inf DISCOM
COL Frederick Mitchell	8th Inf DISCOM
COL Kenneth A. Jolemore	82d Inf DISCOM

These orientations have been conducted by the LOGC Commander or Deputy Commander in conjunction with the directors and other senior staff members. The discussions have two objectives: first, to let the Colonels know what the LOGC is doing in those areas which will have a direct impact on their new assignments; and secondly, to discuss the current logistics conditions facing them in their commands and what the LOGC can do to assist them.

FOCUS 76. At the Logistics Center staff meeting of 14 April 1975, MG Graham directed that his concept of the emerging logistics system be implemented by the Logistics Center staff. Essentially, this concept advanced a new streamlined combat logistics system which focused support on the combat elements. The key feature of the concept was to provide support on a weapons systems basis, emphasizing "support forward." Rationale for the new system was derived from experience gained from logistics systems used during previous wars, managerial and technological changes which had affected the logistics system, lessons learned from the 1973 Mideast War, and current realities. In order to coordinate and expedite the introduction of this concept to the Army, the Logistics Center staff established it as a Major Program Objective (MPO) on 9 June 1975. The name of the MPO was FOCUS 76.

Several actions were taken by the Logistics Center in support of FOCUS 76. Briefings were given to the 5th and 6th Army Headquarters, a video-taped version of the briefing was made, FM 54-9 was approved for publication, and the COGS (Combat Oriented General Support) and MISMAC (Missile Materiel Center, GS) were completed and forwarded to TRADOC Headquarters. Additionally, the basic briefing was presented to all the



TRADOC schools and to several combat division headquarters. Finally, MG Graham wrote an article, "The Emerging Logistics System," which appeared in the September-October 1975 issue of Army Logistician.

Funding. The Logistics Center Command Operating Budget Estimate (COBE) for FY 77 was \$9,959,600, which included funded requirements of \$8,345,800 and unfunded requirements of \$1,611,800. General Graham submitted the following rationale for additional personnel spaces and travel funds:

1. Manpower

Nonrecognition of required spaces and mandated space reductions, to support constant increases to workload, are significantly affecting this Center's capability to sustain missions assigned with the level of professionalism required. Constant reprogramming of available resources is exercised to accommodate time-dependent priorities, impairing still further other missions with high visibility. The major imbalance between resources and workload identified in this submission equate to fourteen military and fifty-five civilian space requirements.

Subsequent to the latest manpower reduction (Jan 76) this Center's workload has increased by the following:

- a. Corps Automated Requirements -  
Major mission change - Mar 76
- b. International Logistics Office -  
New mission - Apr 76
- c. MAWLOGS-DSS models - New mission - Feb 76
- d. SAILS - Major mission change - Apr 76
- e. Planning Factors Management Office -  
Clarification of resource requirements -  
Apr 76
- f. Maintenance Quality Specialist Program -  
Clarification of resource requirements -  
Apr 76

Utilization of management tools (management surveys, quarterly reviews, etc.) reflects the ability of LOGC management to maximize resource utilization against the programmed workload. However, regardless of liberal use of overtime and "Hire-Lag"

closure, the increased workload cannot be accomplished unless requested resources are recognized, or an acceptance of deferments or slippages in major assigned program.

## 2. Travel

This Center considers a FY-77 base travel target of \$505,000 totally unacceptable.

a. In FY-76 the travel program requirement was \$825,000 of which \$705,000 was funded. Due to the moratorium placed on SAILS, the LOGC cancelled the unfinanced requirement (\$120,000) (Budget Execution Review, FY-76).

b. During second quarter of FY-76, TRADOC withdrew \$100,000 in target, authorizing this Center a revised FY-76 travel target of \$605,000.

c. During third quarter of FY-76 this Center requested restoration of \$90,000 of the withdrawal (which was granted, message 301245Z Apr 76 TRADOC) revising FY-76 travel target to \$695,000.

d. Budget Manpower Guidance, FY 77, reflects a travel target of \$505,000. Attempts have been made to determine the rationale for a reduction of \$195,000 over FY 76 base to no avail. It should be noted, this Center has programmed funds for \$695,000 for FY 77 travel with possible further requirements surfacing during the Budget Execution Review in support of new missions identified in paragraph 1.

e. It is recognized that the FY 77 Budget and Manpower Guidance travel target of \$505,000 could be in error. If so, it is anticipated that corrections will be made prior to FY 77 contract signing.

The Army Study Program. A new quarterly update program was initiated during the second quarter of FY 76 to insure at least a quarterly review and update of each study in the LOGC portion of the Army Study Program. This program will insure that the DD Form 1498 for each study receives the necessary review by each responsible action officer and will provide a more viable management tool. The procedure involves sending detailed updating instructions and copies of appropriate DD Form 1498 to each of the associated schools and the LOGC staff directorates. The updated copies of the DD Form 1498 are then reviewed and consolidated, and copies sent to TRADOC and DLSIE. Additional copies of the revised DD Forms 1498 are sent to each LOGC staff directorate responsible for monitoring these studies so the study sponsor will be informed of the latest study status. The initial update cycle was completed and copies of revised DD Forms 1498 distributed as stated above on 17 December 1975.

Personnel Changes in the Command Group and the Directorships  
July 1974 - September 1976

Position	Date of Assignment
Deputy Commanding General	
Brigadier General Ernest J. Vuley, Jr.	1 July 1975
Chief of Staff	
Colonel Virgil Stone	until 26 May 1975
Mr. Frederick H. Terry (Acting)	26 May 1975
Colonel James H. Carroll, Jr.	1 July 1975
Deputy Chief of Staff of Operations	
Colonel Ralph C. Robinson	until 31 July 1974
Lieutenant Colonel Robert P. Johnson	1 August 1974
Colonel William E. Whelan	1 September 1975
Colonel Ivan R. Prince	1 August 1976
Organization Directorate	
Colonel Donald S. Hanline	until 31 May 1976
Colonel Chester A. Woods	22 May 1976
Training and Education Directorate	
Colonel Henry G. Allard	until 21 July 1975
Colonel Carl W. Hance	21 July 1975
Operations Analysis Directorate	
Colonel Henry T. Jackson	until 20 August 1975
Colonel George A. Lynn	20 August 1975
Colonel Robert P. Johnson	1 July 1976
Concepts and Doctrine Directorate	
Colonel Herbert T. Casey, Jr.	until 30 June 1975
Colonel Emil E. Kluever	10 September 1975
Colonel Robert H. Kies (Acting)	1 March 1976
Colonel Donald G. Werner	16 August 1976
Mr. Carshall C. Carlisle, Jr., Deputy Director, served as Acting Director during those times when a Director was not assigned.	
Materiel Directorate	
Colonel K. C. Van Auken	until 31 July 1976
Colonel R. W. Fisher	12 August 1976

Figure 5

CHANGES TO THE LOGC TDA OVER A TWO YEAR PERIOD				
	30 September 1974	30 September 1975	30 September 1976	
TDA Authorized	580	605	604	
TDA Assigned	520	563	558	
Officers				
TDA Authorized	208	192	185	
TDA Assigned	185	186	154	
Civilians				
TDA Authorized	318	344	343	
TDA Assigned	279	304	319	
Enlisted				
TDA Authorized	54	69	67	
TDA Assigned	56	73	73	

Figure 6

COMPARISON OF LOGISTICS CENTER'S MAJOR PROGRAM OBJECTIVES, 1974-76

August 1974	June 1975	September 1976
1. Improve repair parts support to the Army	Implement FOCUS 76	Implement FOCUS 76
2. Provide forward area rearming & refueling capability for Army aircraft	Improve repair parts support	Improve repair parts support
3. Quantify requirements for helicopters in a logistics role in the Army	Analyze and improve division logistic support operations & structure	Analyze and improve internal logistics at the company/battalion level
4. Improve DSU operations throughout the Army	Analyze and improve corps logistics support operations & structure	Analyze and improve division logistic support operations and structure
5. Improve professionalism in logistics officers through improved career management and training	Analyze and improve CONUS installation logistics support operations & structure	Analyze and improve corps logistic support operations & structure
6. Provide in-transit visibility	Improve logistic support planning to maximize readiness of combat materiel systems	Analyze and improve CONUS installation logistics support operations & structure
7. Develop and implement adequate RAM-D methodology in support of Army materiel	Provide in-transit asset visibility to division level	Provide in-transit asset visibility to division level
8. Provide for full utilization of modern container systems in the Army	Maximize utilization of container systems	Maximize utilization of container systems
9. Develop techniques for use in designing organizations structures that will be flexible and easily tailored to requirements	Improve force readiness through development of an enhanced TI/QC program	Improve force readiness through development of an enhanced TI/QC program

Figure 7



August 1974	June 1975	September 1976
10. Improve training assistance to reserve component logistical units	Relate logistic resources to combat effectiveness	Relate logistic resources to combat effectiveness
11.	Improve training assistance to logistic units	Improve training assistance to logistic units
12.	Accelerate the standardization of functional ADP systems for logistics management and operations	Accelerate the standardization of functional ADP systems for logistics management and operations
13.	Improve career development of professional logistics personnel	Improve career development of professional logistics personnel

Figure 7 (Continued)

## II

### CONCEPTS AND DOCTRINE DEVELOPMENT

Corps Support Command (COSCOM) Roundout. As early as the beginning of 1975, the Logistics Center began to collect logistics data which could be used to develop reserve component force structures. The intention was to analyze this data and then provide to FORSCOM periodic reports, which might prove helpful in validating requirements for various types of reserve component logistic units. In addition, they were to be used to identify candidates for elimination, modification, or emphasis.<sup>1</sup> This rather modest exercise was greatly expanded in scope and significance on 3 June 1975, when the Secretary of Defense directed that the Army should examine the integration of active and reserve forces beyond the current affiliation program: "Specifically, the Army should develop and evaluate a conceptual plan to use the wartime chain of command for supervising peacetime training, readiness, and operational planning for all active and reserve units, including combat, combat support, and combat service support, planned for deployment by M+60."<sup>2</sup> The Logistics Center's response was to develop, analyze, prepare in format, and present data regarding the need to "roundout" active duty corps support commands by creating "Roundout Packages" within the reserve component. There were four COSCOMs in the active Army at the time, three of them were at about half strength and would require considerable augmentation in order to carry out their full wartime role. The 1st COSCOM at Fort Bragg was nearer to full strength but would require augmentation of its materiel management center to achieve full capability. If a full mobilization were to occur, it was anticipated that a fifth COSCOM would be required. The Logistics Center recommended the creation of four COSCOMs (1) and one full COSCOM, all in the reserve components. The COSCOMs (-) would be individually tailored to "roundout" the four active Army COSCOMs. The LOGC study produced detailed data on specific COSCOM "roundout" needs in regard to both command/control elements and the specific type of unit required to support a 4 2/3 division corps. Additional data was developed on current locations of COSCOM support units (Ammo, DS, GS, etc.) of which approximately 133 were required to fill out a COSCOM for wartime operation. Substantial numbers of these units, it was discovered, were in the reserve components; the study determined geographical areas (250 mile radius circle) within

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<sup>1</sup>Ltr, ATCL-CDD, MG Graham to General Bernard W. Rogers, Commander, FORSCOM, 20 January 1975.

<sup>2</sup>Briefing on COSCOM Roundout prepared by Concepts and Doctrine Directorate, US Army Logistics Center.

the United States where maximum concentrations of these units existed. The goal was to "marry" each active Army COSCOM with a reserve component "COSCOM Roundout" package, each package individually tailored to meet the mobilization requirements of the active Army COSCOM.

In March 1976, FORSCOM assumed the proponentcy for the concept and worked on refining the data. However, the Logistics Center continued to provide assistance. The Logistics Center also provided briefings on the concept to officers from the Office of the Chief, Army Reserve (OCAR).<sup>3</sup>

Special Analysis of High Mobility Vehicles (HIMO) Study. In 1969, the Department of the Army requested the US Army Combat Developments Command (CDC) to conduct a troop test, brigade size, that would compare tactical with high mobility vehicles. In 1973, CDC recommended that the troop test be canceled. A major reason for this request was the concern that a troop test would not produce conclusive results since it would be of relatively short duration and would represent only one terrain and climatic condition. An alternative to the troop test was proposed that would simulate a test of the vehicles in different geographical areas of the world under varying tactical postures and climatic conditions. The Army did not have an accurate appraisal of its need for high mobility vehicles in its TOE units in the event of an actual armed conflict in some geographical location. As a result, future funding for vehicle requirements could not be properly determined. In addition, the Army did not have an adequate appraisal of its HIMO fleet in terms of cost effectiveness, the role each vehicle should play, and where it should be used.

On 24 May 1973, the Assistant Chief of Staff for Force Development (ACSFOR) agreed with TRADOC (Prov) to cancel the troop test if more detailed information was furnished. The requested supplementary details were submitted by TRADOC on 21 August 1973; and, on 15 January 1974, ACSFOR approved the analysis plan as an alternative to the Troop Test, while adding the additional requirement to address the optimal mix of tracked cargo carriers and high mobility tracks. On 18 January 1974, TRADOC requested the Logistics Center to schedule a conference to develop a preliminary draft study directive. This conference met at the Transportation School on 12 February. Another working conference was held at the Logistics Center on 19-20 March.

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<sup>3</sup> MFR, ATCL-CDD, Mr. Charles LeCraw, Jr., to Director, Concepts and Doctrine, 2 October 1975, subj: Trip Report--COSCOM Roundout (ACN 22163).



By June 1974, the draft study directive (revised) was finished. The study sponsor was the Logistics Center. The study agency was the Transportation School. The objectives were threefold:<sup>4</sup>

- 1) Determine the impact of the capability of two competing fleets of support vehicles, one of high mobility vehicles (HIMO) and one of standard mobility vehicles, to maintain the "combat potential" of a brigade in various conditions of weather and terrain and combat postures.
- 2) Identify the preferred mix of standard and high mobility vehicles that will provide cost-effective mission performance.
- 3) Determine the adequacy of the proposed basis of issue (BOI) for HIMO vehicles.

The high mobility vehicles identified for the study were the:

- 1) M561, 1 1/2 ton Gamma Goat.
- 2) M656, 5 ton Truck Cargo, 8x8.
- 3) Goer, 8 ton, M520 Truck Cargo.
- 4) Goer, 2500 gallon, M559 Truck Tanker.
- 5) Goer, 10 ton, M653 Truck Wrecker.
- 6) M548, 6 ton Carrier Cargo, Tracked.
- 7) Twister Dragon Wagon (to be studied in side excursions only).

Standard mobility vehicles identified for the study were the:

- 1) 1 1/2 ton, Truck Cargo, 4x4, M715.
- 2) 2 1/2 ton, Truck Cargo, 6x6, M35.
- 3) 5 ton, Truck Cargo, 6x6, M35.
- 4) 10 ton, Truck Cargo, 6x6, M125.

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<sup>4</sup>Draft Study Directive, ATSP-CTD-CS, Special Analysis of High Mobility Vehicles, ACN: 16743, June 1974.

- 5) 5 ton, Truck Cargo, 6x6 and 12 ton semitrailer, M125 tractor/ semitrailer combination.
- 6) Truck, Wrecker, 5 ton, M816.
- 7) Truck, FS, 2 1/2 ton, M49.

The 1/2, 4x4, M151 was considered as both a high mobility vehicle and a standard mobility vehicle for the purposes of the study.<sup>5</sup>

The study was restricted to four geographical locations and the weather conditions consistent with those areas. Each geographical area developed was approximately 100x30 kilometers and represented a portion of the operational area within each of the four geographical areas contained in TRADOC's standard scenarios for combat development: the Mid-East, Europe, Southeast Asia, and Northeast Asia. The Combined Arms Combat Development Activity (CACDA) was given the responsibility for identifying and refining the scenarios.

On 12 June 1974, the TRADOC Commander directed that the HIMO study include tactical missions. A meeting to accomplish this was held at CACDA on 13 August. A paragraph was inserted into the study directive which stated that "the study will address the tactical movement of combat support and combat service support vehicles in their multiple roles of providing support for forces in the combat zone during a minimum of three combat postures."<sup>6</sup> An additional change was later made when the XM808 Twister vehicle and the Caterpillar Flat Bed Truck were included as HIMO vehicles in a study directive addition.<sup>7</sup>

One aspect of the study was to be done under contract by the General Research Corporation (GRC). This involved developing the interface between the AMC-74 model, developed by the Engineer Waterways Experiment Station (WES), and the Tactical Vehicle Fleet Simulation (TVFS) model.

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<sup>5</sup> Ibid.

<sup>6</sup> Ltr, ATCL-CC, COL Herbert T. Casey, Jr., Director, Concepts and Doctrine, to Commander, US Army Training and Doctrine Command (ATCD-SP-L), 19 August 1974, subj: Revision of HIMO Directive/Plan.

<sup>7</sup> Ltr, ATCD-SP-L, MAJ Michael A. Randall, Assistant AG, to Commander, US Army Logistics Center, 7 March 1975, subj: Draft Study Documents, Special Analysis of High Mobility (HIMO) Vehicles.

The contract was initiated in January 1975, but almost immediately problems developed. It was decided that the TVFS would have to be modified in order to achieve maximum study benefits, and the contract was revised accordingly.<sup>8</sup> Within another month, GRC requested another \$8,431.00 to complete their work. This meant that the company was requiring about \$12,000.00 above the original award of \$44,762.00 to do their work, and questions were raised about the increasing expense.<sup>9</sup> However, GRC was given the requested funds. On 23 July 1975, General Research Corporation delivered its first interim report, entitled, "Special Analysis of High Mobility Tactical Vehicle Fleet Simulation Model (Middle East Geographic Area and Scenario)." The report provided an analysis of alternate fleet mixes in the Mid-East. The second interim report, covering the West German geographical area, was delivered on 19 September 1975. The Waterways Experiment Station, in the meantime, had delivered its final report, "Mobility Analysis of Standard and High Mobility Tactical Support Trucks (HIMO Study)," on 5 August 1975. At the final Study Advisory Group meeting, held at Fort Eustis on 5-6 November 1975, the GRC and WES reports were approved, and some changes were recommended to the analysis conducted by the Transportation School.

Relatively early in the development of the HIMO study, concern was expressed about the viability of the Goer as a high mobility vehicle. Indeed, on 24 June 1975, General DePuy concluded at a Goer Update briefing that "high mobility is apparently a myth."<sup>10</sup> Nine months later, on 31 March 1976, the TRADOC Commander was briefed once again on the study, and he approved the most significant recommendation that no further Goers or Gamma Goats be procured since their slight mobility advantage did not outweigh the cost disadvantage. The final study was forwarded to Department of the Army Headquarters in May 1976.

Tactical Vehicle Water Crossing Requirements (WACROSS) Study. This study was initiated by the Logistics Center in July 1975, to determine the Army-wide water crossing requirements for tactical vehicles and whether or not the existing capability should be adjusted. It was a

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<sup>8</sup> Ltr, ATCL-CC, COL Virgil M. Stone to Commander, US Army Training and Doctrine Command (ATCD-CP), 1 April 1975, subj: Revised Contractual Support for the HIMO Study.

<sup>9</sup> Ltr, ATSP-CTD-CS, COL Gordon E. Moore, Chief, Concepts and Studies Division, US Army Transportation School, to COL Herbert T. Casey, 8 April 1975, subj: Special Analysis of High Mobility Vehicles, (HIMO).

<sup>10</sup> MFR, ATCL-CC, Mr. Joseph W. McClure to Acting Director, Concepts and Doctrine, 26 June 1975, subj: Trip Report.

follow-on effort to the HIMO Study and used the same scenarios and simulated terrains that were developed for that study. The WES was to assist through the application of the Army Mobility Model to predict vehicle performance in negotiating water barriers. By the end of June 1974, most of the inputs required to simulate water barriers had been completed. The WES was to begin the analysis during the last week in August; however, because of funding problems encountered during the fourth quarter FY 76, and WES's underestimation of the complexity of the problem, only limited progress was made. The Waterways Experimentation Station was expected, however, to prepare a draft report during the first quarter of FY 77. The Transportation School was the study agency.

Analysis of Equipment Transporter Requirements (HET) Study. The Logistics Center began the HET study in mid-August 1975. It was conducted in-house through an ad hoc arrangement, with Concepts and Doctrine designated the lead directorate. The purposes of the study were (1) to identify current doctrine for HET employment, (2) develop a concept of employment of the HET in the future logistics system environment, and (3) to determine what adjustments should be made to the current basis of issue.

The final draft of current doctrine was completed in October 1975 and was coordinated within the Logistics Center and the Ordnance and Transportation Schools. A final coordinated draft of the concept for future HET employment was to be completed by 20 August 1976; however, higher priority projects interrupted work. Also, problems were caused by the lack of a TRADOC theater scenario. It was decided to use data available from sequence IIA rather than delay the project further. The new goal was to complete a draft report by the second quarter of FY 77.

Field Water Distribution. The Mid-East scenarios highlighted the problems in the Army's current capability to handle expeditiously large scale water distribution requirements over long distances. In May 1975, therefore, TRADOC tasked the Logistics Center to conduct a two-phase study to determine what should be done to alleviate the situation. Doctrinal and organizational considerations were to be addressed in the response. On 13 August 1975, the Logistics Center recommended to TRADOC that a combination of 5,000 gallon semitrailers and hoseline be utilized. This was followed on 9 March 1976 with a further recommendation by the Logistics Center that a Transportation Medium Truck Company be utilized to haul the 5,000 gallon semitrailers and that a Quartermaster Petroleum Pipeline and Terminal Company be designated to operate the hoseline. TRADOC approved both recommendations and forwarded them to the Department of the Army.



Flexible Pipeline for Water Distribution. In the SCORES logistics analysis, the location of fresh water sources was identified as a significant problem. For certain contingency locations, the water sources were over 100 miles from the area of operation. To alleviate this problem, a concept was proposed for the Army to obtain 250 miles of flexible pipeline in order to achieve a rapid, efficient means of transporting water from the source to the user. On 13 May 1975, TRADOC designated the Logistics Center as the proponent for evaluating the concept. To accomplish this evaluation, a two-phase study was planned. The first phase was to select a course of action and to develop the detailed requirements. The second phase was to examine the doctrine and organizations needed to support the selected course of action. The Engineer, Quartermaster, and Transportation Schools were tasked by the Logistics Center to submit information on certain aspects of the study relevant to their areas of interest.<sup>11</sup> In early June, a representative from Concepts and Doctrine Directorate visited Camp LeJeune, North Carolina, to evaluate the Marine Corps Amphibious Fuel Support System, which was to be used during Joint Exercise Solid Shield 76.<sup>12</sup>

The first phase of the study was to be completed by 13 August 1975; however, at the request of the Department of Army (DAMA-CSS), an interim reply was on 31 July. This interim reply proposed four alternative courses of action to deliver water to troop locations:<sup>13</sup>

1. Obtaining a 4" or 6" commercial flexible pipeline.
2. Using an existing 4" or 6" military flexible pipeline.
3. Using 5,000 gallon semitrailers.
4. Using a combination of flexible pipeline and 5,000 gallon semitrailers.

The course of action recommended was number 4, above. The final results of the first phase was forwarded to TRADOC on 13 August. This document

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<sup>11</sup>Ltr, ATCL-CDD, LTC Robert P. Johnson, LOGC Deputy Chief of Staff for Operations, to the Commandants of the Engineer, Quartermaster, and Transportation Schools, 27 May 1975, subj: Flexible Pipeline for Water Distribution.

<sup>12</sup>Msg, ATCL-CDD, CDR, USALC, to RUCBSAA/CONCLANT, 282220Z May 75, subj: Notification for Official Non-participating Observer-Joint Exercise Solid Shield.

<sup>13</sup>Msg, ATCD-SP-P, CDR USATRADOC to DA WASHDC (DAMA-CSS), 31 July 1975, subj: Flexible Pipeline for Water Distribution.

reduced the possible courses of action to two: using 5,000 gallon semitrailers to supply water to all troop locations or using a combination of 5,000 gallon semitrailers and hoseline to supply water to all troop locations. The final recommendation, however, remained the same as in the interim reply.<sup>14</sup> Specifically, it was further proposed that TRADOC procure 76 miles of 6 inch Marine Corps hoseline and 32 5,000 gallon semitrailers. TRADOC indicated that the Department of the Army would approve these expenditures.<sup>15</sup>

Even before the Logistics Center had submitted its results on phase two of the study, TRADOC had considerably expanded the study's scope. On 23 June 1975, the Logistics Center was directed to (1) review the doctrine on the wholesale and retail distribution and storage of water, (2) in coordination with CACDA, establish a proponent school for water distribution and storage, and (3) recommend additions to current TOE equipment to enable units to accomplish water distribution and storage.<sup>16</sup> In response to the second tasking, the Logistics Center, on 6 October 1975, proposed that the Quartermaster School be given the responsibility for water distribution and storage. This required a revision of AR 115-20, Field Water Supply.<sup>17</sup>

In January 1976, Concepts and Doctrine Directorate completed its recommendations for revising doctrine and organizations in order to provide water distribution in a desert environment. On 19 February, the recommendations were approved by MG Graham in a decision briefing. The recommendations were forwarded to TRADOC on 9 March, thus completing phase two of the study.

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<sup>14</sup> Ltr, ATCL-CDD, Mr. Carshall C. Carlisle, Jr., Acting Director, Concepts and Doctrine, to Commander, TRADOC (ATCD-SP-L), 13 August 1975, subj: Flexible Pipeline for Water Distribution.

<sup>15</sup> Fact Sheet, ATCL-CDD, Mr. Carshall C. Carlisle, Jr., 18 August 1975, subj: Water Distribution.

<sup>16</sup> Ibid.

<sup>17</sup> Ltr, ATCL-CDD, COL W. E. Whelan, LOGC Deputy Chief of Staff for Operations, to Commander, US Army Combined Arms Center and Fort Leavenworth; Commandants, US Army Engineer School, US Army Quartermaster School, and US Army Transportation School; and Superintendent, Academy of Health Sciences, 6 October 1975, subj: Establishing Doctrine for Water Distribution.

Concept of Night Aircraft Maintenance (CONAM) Study. This study was initiated and sponsored in 1973 by TRADOC Headquarters and performed by the US Army Transportation School. The study considered night maintenance of aircraft, avionics, and aircraft armaments from organization through general support categories. It was limited to Army in the field maintenance and did not include operations in CONUS or operations of TDA maintenance elements. The study findings were based on extensive research of pertinent literature and on the results of a seven week aircraft maintenance force development test and evaluation exercise conducted at night by MASSTER at Fort Hood, Texas. The results of the study and test was a proposal to revise current doctrine, organizational structures, and training programs for night aircraft maintenance. The final draft was forwarded to Headquarters, TRADOC, on 7 January 1976.

Aircraft Refueling and Rearming System Study (AARS). The increase in requirements to provide fuel and ammunition for attack, assault, and scout helicopters operating under tactical conditions during the conflict in Southeast Asia caused some refueling and rearming problems. The increase resulted, partly, from the introduction of the AH-1G attack helicopter, with its attendant increase in armament capability and expenditure rate and a decrease in crew requirements from four to two. Consequently, there were no crew members available to assist in rearming and refueling. This and other considerations necessitated and emphasized the need for refueling/rearming points located forward of the aviation unit base where Army aircraft could be rapidly turned around.

The Forward Area Refueling and Rearming Study (FARR), conducted by the Combat Development Command's Supply Agency, explored many of the forward area refueling and rearming point areas; but it did not delve into the logistical aspects of FARRP (Forward Area Refueling and Rearming Point). The purpose of the ARRS Study was (1) to identify the logistics aspects of (personnel, equipment, and resupply mechanisms) required to operate refueling and rearming points for attack, assault, and scout helicopters operating near or forward of the battle edge, and (2) to identify the adequacy of the supply procedures for support of the FARRPs to insure maximum effectiveness of Army aircraft utilizing them.

The FARRP, as envisioned and addressed in this study, is a location where aircraft refueling and rearming is accomplished, established at an area other than the aviation unit's heliport/airfield. It is a temporary facility, transitory in nature, established for a specific duration and mission. This study addressed the tactical employment and operational aspects of the FARRP, utilizing the ME-I TRADOC Standard Scenario. It also determined or confirmed the resources required to operate and support this facility and outlined the transport needed to emplace, provision, and resupply the FARRP. The ARRS Study was briefed to, and

by, MG McAlister, TRADOC Headquarters in June 1975. The study was distributed for implementation in July 1975. Necessary changes in doctrine, organizations, and materiel were to be made to insure the most efficient and responsive refueling and rearming of Army helicopters when they operate from a forward area refueling and rearming point.

Air Cavalry Combat Brigade (ACCB). The Training and Doctrine Command tasked the Logistics Center in May 1976, to review operational and logistics concepts of employment for the ACCB and to recommend the best methods for providing missile maintenance support to a deployed ACCB. Previous LOGC recommendations for combat service support to the ACCB included nonsupport for 100 percent resupply of the forward area rearming and refueling point by both air and ground means. This position was reiterated in the Logistics Center response. In addition, the Logistics Center recommended that the DS element organic to the ACCB retain the capability for repair of the airborne missile launch system by the identification and replacement of assemblies and sub-assemblies (line replaceable items and printed circuit boards). Repair of defective assemblies and sub-assemblies and the supply source for these parts would be at the supporting GS level.

Armored Cavalry Regiment, Support Battalion (ACR Spt Bn). By TRADOC letter, ATCD-CA, 10 June 1975, the Logistics Center was directed to develop Unit Reference Sheets for an ACR support battalion structure. In addition, the LOGC was tasked to develop the concept for employing the support element and to evaluate the concept against the European Scenario. Starting on 16 June 1975, a series of in-house coordination meetings were held to determine required actions in support of this task. As FY 75 ended, a draft organization and concept for employment were being completed in preparation for formal tasking of other TRADOC centers.

During FY 76, input from the proposed concept was provided by and coordinated with the Logistics Center associated schools. The concept of employment was approved by the LOGC Commander on 3 June 1976. Subsequent to this approval, the organizational structure was also approved on 18 August. The completed support battalion package was forwarded to USAREUR, FORSCOM, AARMS, and the LOGC associated schools on 30 August 1976 for concurrence/comments and recommendations.

Communications Security Logistics Review (COMSECLOG). The COMSECLOG review advisory group adopted proposals during FY 76 that integrate COMSEC hardware support into the conventional communications electronics support system considering EAD, EAD-X, and the Restructured General Support concept that integrates supply and maintenance. The COMSEC



software was to be managed by the Signal Support elements at each echelon. A major impact of the adopted proposals was to eliminate the dedicated, vertical COMSEC retail support structure then operated by the US Army Communications Command (USACC). Because of this, USACC requested that the lead role for the review effort be transferred from them to a TRADOC agency. Subsequently, the Signal School was assigned the lead role and, in that capacity, will prepare the final report, scheduled for completion in June 1977. Revision of FM 29-11, "Communications Security Logistics Support in a Theater of Operations," and appropriate TOEs will be accomplished by them as follow-on actions.

Division Level Data Transmission/Source Data Requirements. The purpose of this effort is to define the division source data automation baseline and the requirements for division data transceivers to support administrative/logistics automated data systems. The baseline definition will allow an integrated logistics support concept to be developed by DARCOM for support of a source ADPE that is not included in the division data center. The Logistics Center was tasked for this effort because of its expertise and proponentcy for CS3 and Project CAR and will coordinate with PACDA, the Signal School, USAREUR, and FORSCOM. Fourteen divisions of FORSCOM and USAREUR have been surveyed for their source data automation and data transceiver requirements. An evaluation of the survey results will be the basis for a report to be provided TRADOC and the Department of the Army. The report will define the source data baseline equipment and provide rationale on data transceiver requirements.

Combat System, Rearm/Refuel in Battalions (COSRRIB). This study was initiated at the request of General DePuy in January 1976. The study addressed the requirement for an armored rearming and refueling capability to support tank, mechanized infantry, and DS artillery units engaged in the Covering Force Area (CFA) of the combat zone. The study's tentative conclusions at the end of FY 7T were that: there is no requirement for an armored refuel vehicle; there is no requirement for an armored rearm vehicle for DS artillery; there is a requirement for an Armored Forward Area Rearm Vehicle (AFARV) to support engaged elements of tank and mechanized infantry units. Based on these conclusions, the Director of Concepts and Doctrine proceeded, in September 1976, to prepare a statement of need for a large vehicle; i.e., the Stretch M113. The Director of Materiel was also planning to prepare a draft LOA to initiate action with DARCOM. These actions were preceding a formal statement of need, which would appear in an approved COSRRIB Study. The Study was scheduled for completion in October 1976. It is contemplated that approval of the study, and results of a test underway at Fort Knox, will provide doctrine

for a rearm vehicle. The final result, presumably, will be a paragraph in a field manual explaining how to use an already available M113 or a ROC to procure kits or a determination that the M113 is not suitable--a distinct possibility since the payload appeared to be 3,200 pounds.<sup>18</sup>

DA Concept Study--Army Wide Calibration. DARCOM was appointed by the Department of the Army in February 1976 to conduct the Army Wide Calibration Study. The purpose of the study was to standardize the calibration program to insure maximum efficiency, compatibility between the services, and effectiveness in war and peace. The Logistics Center was appointed in March to represent TRADOC on the study. Thus, the LOGC Commanding General serves as a member on the Senior Officers Review Board for the effort. Thus far, current doctrine, publications, unit organizations, and the emerging logistics system have been reviewed and onsite visits to CONUS installations have been conducted. A trip to Europe was made in August 1976, and a proposed concept was being developed.

Authorized Stockage List (ASL) Mobility Study. This study was initiated in January 1976. Its purpose was to develop revised guidance and techniques for improving the DSU's capability to move its ASL. Sixteen divisions were asked to provide copies of their ASLs and loading plans. Seven divisions responded. During FY 76, it was determined that kits for bins and cabinets were available from the government (GSA, DSA, etc.) and commercial sources that can be used for carrying ASL items. Procedures for prioritizing and configuring ASL continued to be investigated. Visits were made to the 1st Cavalry, 2d Armored, and 101st Airborne Division during April, May, and June 1976. The 8th Infantry Division was planning a test using MILVANS. Test results were to be provided the Logistics Center.

Anti-Armor Systems Program Review (ASPR). On 12 February 1976, General DePuy was given a short status report on ASPR. The following day, the Department of the Army requested the Logistics Center to analyze the adequacy of the DA Authorized Acquisition Objective (AAO) to support tactical distribution of TOW and Dragon missiles in the 1978 to 1982 Program Objective Memorandum (POM) for the European Scenario. A preliminary analysis was presented to Generals Burdeshaw, Vinson, Graham, and DePuy during the period 9-12 March 1976. On 23 March, the Logistics Center ASPR briefing was presented to the CAC Commander. The ASPR briefing was presented to the Vice Chief of Staff of the Army and 67 other general officers/civilian equivalents at the Combined Arms Center

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<sup>18</sup> MFR, ATCL-D, COL Ivan R. Prince, Jr., LOGC Deputy Chief of Staff for Operations, 16 September 1976, subj: Status of Rearm and Hardened Battalion Recovery Team Vehicle.

on 27-28 April. The Logistics Center portion of the briefing stimulated discussion in the areas of anti-armor missile support, missile AAO analysis, reserve force restructuring, and wartime repair parts determinations. By the end of FY 76, all ASPR discussions and actions had been absorbed into the Anti-Armor Capability Study.

Army Force Integration Study (AFIS). A short computer assisted routine was developed to allow rapid structuring and compilation of type COSCOMs and other forces. Input for one theater and several type corps were submitted through CACDA to DA on 30 March 1976. Subsequent CACDA guidance requested the Logistics Center to examine once more the wartime chain of command for accuracy and doctrine. General Vuley directed that the LOGC analyze the support groups and reduce the number if possible. Consequently, sixty general supply companies were deleted and replaced with COGS units. This reduced the number of S&S battalions and allowed a reduction in support groups from three to two for the various type corps. The total number of troops deleted was 13,000. The final results were submitted to CACDA on 24 May 1976.

United States Army Security Agency (USASA) Tactical Maintenance Concept (1976-1986). The purpose of this action was to implement the Army Chief of Staff's recommendations that USASA resources at corps/division level be integrated under the full command of the supported commanders. On 31 October 1975, the Department of the Army designated TRADOC, supported by FORSCOM and the USASA, to develop appropriate plans for the integration process. TRADOC, in turn, designated the Logistics Center as its action agency. Because of inadequate information, TRADOC was unable to concur in a proposed milestone schedule developed by the USASA. To provide a better understanding of the magnitude of the problem, a meeting was held at the Logistics Center on 24-25 February 1976; and a new milestone schedule was developed.

During the remainder of FY 76, the Logistics Center completed the three milestones scheduled, which necessitated the review of 21 MTOEs in order to determine pre-1978 workloads associated with organic equipment, including ASA peculiar items, and subsequently to determine the adequacy of personnel MOS and the organization necessary to provide capabilities desired at organizational level. During the completion of the first three milestones, evaluation objectives were defined which were to be used in testing the Operation and Organizational (O&O) concept. The remaining milestones will address the interim changes in policy, doctrine, and organization necessary to accommodate effective maintenance support through 1978. A maintenance concept and force structure to support new EW/SIGINT equipment will also be completed. The post-1980 automatic test equipment for ASA units will need to be integrated into the automatic test support system.

Standard Expanded Direct Exchange Evaluation. This evaluation was directed by the Department of the Army as a result of numerous unresolved areas resulting from the DA/AMC (DARCOM) Task Group test of DA Circular 700-24 (Supply and Maintenance Procedures for Direct Exchange) at Fort Carson from June to September 1974. This circular directs the recovery, repair, and re-utilization of unserviceable, economically repairable, army-managed, class IX repair parts at the direct support, general support, and installation levels.

As a result of a Direct Exchange General Officer Steering Group meeting on 22 October 1974, the US Army Logistics Center was tasked by the Department of the Army to evaluate further certain areas associated with basic direct exchange operations. Responsibility for retail level DX was transferred to the Logistics Center on 1 August 1974 for direct and general support levels (TOE) and on 1 November 1974 for installation level. Subsequent tasking by DA expanded the Logistics Center evaluation to include automated procedures developed to support direct exchange operations under the three systems in operation at Fort Carson (SAILS, DLOGs, and NCR 500). The evaluation was divided into two parts. Concept and doctrinal implications of DX was analyzed by Concepts and Doctrine Directorate. Systems Design Directorate assumed the responsibility for evaluating the effect of the three systems on DX operations.

Three installations, two from FORSCOM and one from TRADOC, were selected for evaluation of direct exchange operations for the Concepts and Doctrine evaluation. The collection of data and observations by the Logistics Center continued until December 1975. The final draft report (Part I) was staffed throughout the Logistics Center during the third quarter of FY 76. A nonconcurrence from Systems Design remained unresolved. That directorate voiced two strong objections to the C&D study. First, SD personnel favored having recoverables directed through a single point rather than a "three route" method of operation as proposed by Concepts and Doctrine. Second, SD raised concerns about the volume of transactions associated with either concept.<sup>19</sup> Despite Systems Design's objections, however, the Chief of Staff approved the C&D direct exchange evaluation, and it was forwarded to the Department of the Army on 11 May 1976. Systems Design completed its part later that summer.

CONUS Installation Logistics Support Study (COILS). During the first US Army Logistics Center Advisory Board (LOGCAB) meeting, LTG Kornet, Deputy Chief of Staff for Logistics, Department of the Army, identified

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<sup>19</sup> DF, ATCL-SSO, Director, Systems Design, to Director, Concepts and Doctrine, 26 March 1976, subj: Standard Expanded Direct Exchange Evaluation; DF, ATCL-CUR, Director, Concepts and Doctrine, to Director, Systems Design, 31 March 1976, subj: Standard Expanded Direct Exchange Evaluation.



a need for an in-depth study of CONUS installation logistics. Discussions during subsequent LOGCABs revealed that senior Army logisticians universally agreed that guidance appeared to be lacking regarding operations and missions of CONUS installation logistics. Initial research into the area of CONUS installation logistics revealed a definite void for indoctrinating military personnel being assigned to Director of Industrial Operations (DIO) positions at CONUS installations. In order to improve immediately this condition, a three week course of instruction was initiated at the US Army Logistics Management Center. The course was designed to indoctrinate personnel assigned to or associated with the DIO position.

In formulation of the COILS study effort, various proposals were considered on how much coverage should be achieved in a single study effort. Preliminary analysis of CONUS installation logistics indicated such an operation to be a highly complex area because of its direct involvement with such functions as funding, procurement, personnel, CITF, contracting, and ADP applications. For this reason and because of personnel constraints, it was decided to limit coverage to the transportation, maintenance, supply, and services areas. However, because of the transfer of responsibility for commissary operations from the MACOMs to the US Army Troop Support Agency, the services substudy was subsequently deferred by COILS Study Advisory Group action. Field visits to some DARCOM installations were scheduled in order that base support logistics operations could be evaluated for possible application at TRADOC and FORSCOM installations.

The objective of COILS was very simply to improve the effectiveness and efficiency of the logistics support to customers at CONUS installations. The Logistics Center sponsored the carrier study for sub-studies which were performed by the Quartermaster School, Ordnance Center and School, and the Transportation School. The substudies were to investigate portions of logistics support functions as described below:

- a. Supply (QMS). This substudy will analyze the organization, functions, and performance of CONUS installation supply support. This includes the operation of the installation supply division and supply support activities, such as the clothing sales store, self-service supply center, and central issue facilities. Additionally, an analysis of the level of support required to support active Army units, tenants, and reserve units will be made.

- b. Maintenance (OC&S). This substudy will analyze organization, functions, and performance of maintenance activities at CONUS installations. It will cover GS/DS and organizational maintenance, Direct Exchange, facilities, equipment, workload, and other factors affecting maintenance.
- c. Transportation (TS). This substudy will analyze organization, functions, and performance of CONUS installation transportation activities. It will address movements, both personnel and cargo, relationship with MTMC, and other factors which affect transportation at CONUS installations.
- d. Services (QMS). This substudy will cover food service, laundry and dry cleaning, commissaries, resale and troop issue, the Army Food Service Program, dining facilities management, and subfunctions of these areas.

All of the above substudies will also address the impact of current systems, such as SAILS, BASOPS, DSS, etc., and emerging systems. Other areas to be covered include DAFE, housing, funding, management practices and indicators.

The first meeting of the COILS Study Advisory Group took place at Fort Lee on 1-2 October 1975. The meeting was chaired by the LOGC. In addition to the LOGC member, members were in attendance from DA DCSLOG, TRADOC, FORSCOM, and AMC. Proposed substudy directives in the areas of CONUS installation supply, maintenance, transportation, and services support were discussed and a consensus was reached on each directive. Introductory remarks by MG Graham highlighted the challenges and complexity of an effort associated with a problematic study of installation logistics. He stressed, however, that this study effort was one of the most important endeavors embarked upon since the establishment of the Logistics Center. The LOGC Commander concluded by emphasizing the opportunity before the group to make installation logistics support more responsive and efficient and noted that the efforts of the SAG in forthcoming months can produce results that will have Army-wide benefits.<sup>20</sup>

On 22 October, COILS was briefed to the LOGCAB and received the indorsement of that body. Then the COILS Management Plan was presented to the LOGC Deputy Commander on 24 October 1975 and received his approval. After these actions, the COILS Study Plan and four substudy directives were sent to the field on 14 November 1975.

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<sup>20</sup>MFR, ATCL-CDD, Study Advisory Group (SAG) Minutes, Study: CONUS Installation Logistics Support (COILS), 1-2 October 1975.

An In-Process Review was conducted at the Logistics Center on 13 January 1976. The COILS methodology was approved, as were the substudy plans in the transportation, maintenance, and supply functional areas. The services substudy was postponed because the Troop Support Agency had just assumed control over commissary operations and there were also insufficient manpower resources at the Quartermaster School. On 6 April 1976, a letter was dispatched to TRADOC, FORSCOM and DARCOM requesting permission to visit a total of ten installations under those commands. A proposed itinerary was inclosed. The itinerary was subsequently approved by each command. From July to September 1976, four field visits were made. More were scheduled toward the end of the year, though the total number was reduced from ten to seven.

A COILS IPR was held on 15 July 1976. During the IPR, representatives from the Quartermaster and Ordnance Schools recommended termination of the Supply and Maintenance substudies because of lack of resources and the failure of questionnaires to provide definite problem areas. The SAG disagreed with the recommendations and decided that after the first series of field visits, if the Quartermaster or Ordnance Schools had not identified problem areas, a special IPR would be convened to consider further the two schools' recommendation.

Consolidation of Administration at Battalion Level (CABL). One of General DePuy's primary concerns was to relieve the company commanders of most administrative actions so that the captains would have more time and freedom to train their soldiers to fight successfully on the modern battlefield. The administrative actions, instead, would be accomplished at the battalion level, where they could be handled more professionally than had been the case.<sup>21</sup> On 29 July 1975, the Logistics Center was tasked by the Administration Center to develop the detailed operating procedures for consolidated supply, mess, and maintenance operations at the battalion level. These procedures, with subsequent changes, were submitted on 29 August and 19 September 1975, respectively. In a letter to the Commander of the Administration Center, dated 19 September 1975, General Vuley expressed the Logistics Center support for CABL. He then went on to say:<sup>22</sup>

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<sup>21</sup>Ltr, GEN DePuy to GEN Fred C. Weyand, CSA, 17 December 1975.

<sup>22</sup>Ltr, ATCL-CC, BG Vuley to Commander, US Army Administration Center & Fort Benjamin Harrison, 19 September 1975, subj: Consolidation of Administration at Battalion Level (CABL) FM 292A.

We do, however, wish to emphasize that the results of this test should be evaluated on the basis of whether consolidation improves performance. Particular care must be taken to insure that implementation of CABL proposals will not inhibit the ability of the company to fulfill its command responsibilities.

A feasibility test under the direction of the Administration Center and MASSTER began on 29 September 1975. The purpose of the test was to determine the feasibility of elevating the normal company administrative functions (personnel, supply, mess, and organizational maintenance) to battalion level, thus relieving the company commander and his staff of these administrative burdens. This test was an expansion of the Company Administration (COAD) study.

Since the establishment of the Logistics Center, primary emphasis had been directed toward improvement of logistics units. In October 1975, the Logistics Center Deputy Commander outlined a course of action which focused the LOGC's expertise on the "cutting edge," the company and the battalion. As a result, a Co/Bn level logistics action team was established under the aegis of the Concepts and Doctrine Directorate in November 1975. Subsequently, in December 1975, Co/Bn level logistics was established as a LOGC major program objective. Action officer and senior officer visits were made to Fort Hood to review the progress of the CABL Test and the III Corps initial implementation of its modified CABL procedures. Also, during the period January-March 1976, the Company and Battalion Level Logistics Action Team conducted 42 CABL orientation briefings for major FORSCOM CONUS units and major overseas commands. Representatives from the LOGC and the Administration Center briefed on the areas of the CABL study for which they were the proponent. The Logistics Center briefing, "while not universally accepted without reservation, was viewed generally as a viable concept and a discernible improvement over current procedures."<sup>23</sup>

On 26-27 February, the LOGC briefing was given to representatives from all Department of the Army staff agencies. Representatives from the Office of the Deputy Chief of Staff for Logistics were adamantly opposed to consolidation of PLL at the battalion level. They felt that this would severely restrict the commander's flexibility. Also, centralization, rather than consolidation, appeared to them to be a more palatable alternative in the supply and maintenance areas. The

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<sup>23</sup>MFR, ATCL-CU, LTC George W. McKinzie, 1 March 1976, subj: Deputy Commander's Update.



difference between the two concepts is that consolidation would group functions without preserving unit integrity, while centralization would maintain unit integrity and identification. The DA staff conceded that consolidation/centralization of maintenance administration had merit, but the general consensus seemed to be that elevating the operations (mechanics, tools, etc.) as a general rule would not be viable. Much of the opposition from the DA staff appeared to result from their assumption that they would have an opportunity to review the results of the CABL test. Instead, they learned that the procedures were already being implemented in the field.<sup>24</sup>

In March 1976, the management plan for the major program objective was developed and approved by BG Vuley. A LOGC position was established which advocated the consolidation of the administrative and operational functions of supply and dining facility operations at the battalion level and permissive centralization for maintenance. Procedures for the consolidation of dining facility administrative and operational functions into a dining facility center (DFAC) at the battalion S4 level were done in coordination with the Troop Support Agency and the Quartermaster School. Both TSA and QMS representatives objected to the term DFAC since there are no clerical or administrative personnel authorized in the dining facility or elsewhere in the battalion; however, the term continued to be used.<sup>25</sup> In April 1976, the TCATA (MASSTER) test of CABL was concluded and the final IPR was conducted at Fort Hood. The TRADOC Commander was briefed on the status of the Logistics Center's portion of CABL on 20 April, at which time the Center's approach to DFAC, SAC (Supply Administration Center), and MAC (Maintenance Center) was approved.

One of the three main thrusts of the Co/Bn Logistics Major Program Objective, Improve Technical Documentation/Training (ITD/T), was geared to the development of job performance guides, manuals, and supporting training material to provide Army units the capability to receive, use, and maintain complex equipment with minimum outside technical aid and training support. Contracts were let in late June 1976 for a total of \$2.4 million to Hughes Aircraft Company and Data Communication Incorporated to develop ITD/T materials for tank turrets and wheeled vehicles (2 1/2 ton and 5 ton only). The Co/Bn MPOC participated in this project because of its eventual impact on company and battalion size units. With ITD/T, more training will occur to the company than in the past. Full implementation of ITD/T is not expected until the 1980s.

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<sup>24</sup> Ibid.

<sup>25</sup> Fact Sheet, ATCL-CUC, COL Robert H. Kies, Acting Director, Concepts and Doctrine, 7 April 1976, subj: Logistics at Co/Bn Level; MFR, ATCL-CUC, LTC McKinzie, n. d., subj: Dining Facility Administration Center.

The Co/Bn level logistics team, as an additional aspect of the MPO, identified the need for revision of equipment operators manuals to reduce operator maintenance requirements to those which were essential to mission operation. In June 1976, a list of 57 maintenance significant items was prioritized from a user viewpoint, based upon the importance of the equipment to the support of tactical operations, density of equipment, and the time required to perform operator maintenance checks. This list was forwarded to DARCOM so that it could be used in determining their priorities in reviewing and revising the -10 series manuals for the elimination, simplification, or consolidation of operator maintenance checks.

On 28 July 1976, the LOGC Deputy Commander reviewed and approved the supply, maintenance, and dining facility annexes for forwarding to the MACOMs for review and comment.<sup>26</sup> Comments from the major commands were to be evaluated and, where appropriate, incorporated into the procedures. Subsequently, the procedures manual, along with TOE change recommendations necessary to implement the DFAC and SAC, will be forwarded for TRADOC/DA staffing and approval. On 20 September 1976, the Deputy Commander was given an MPO update. He issued guidance that the implementation of CABL in Army Reserve, National Guard and TDA units was a separate action from implementation in the active Army and would follow at a later date.

Division Logistics Organization Structure (DLOS) Study. The purpose of this study was "to examine the logistics structure of the division in the changing logistics environment of Echelons Above Division (EAD) doctrine, the expanded EAD concept and in light of the Army objective of a 16 division force to assure most efficient and economical support. All possible resource savings will be identified."<sup>27</sup> The Department of the Army DCSLOG tasked TRADOC to conduct the study in October 1974, and the following month TRADOC Headquarters tasked the Logistics Center in turn.<sup>28</sup> The LOGC was to be the study proponent and chair the Study Advisory Group. The Combined Arms Center and the Administration Center were to assist in the study effort and supply representation on the SAG.

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<sup>26</sup>MFR, ATCL-CUC, MAJ C. W. McInnis, 30 July 1976, subj: Review of the Logistics Annexes of the CABL Procedures Manual.

<sup>27</sup>Ltr, DALO-PLD, BG R. H. Thompson, Director of Logistics Plans, Operations and Systems, DA ODCSLOG, 11 October 1974, subj: Study: Division Logistics Organizational Structure (Project 16-78).

<sup>28</sup>Ltr, ATCD-FD, MG Robert C. McAlister, TRADOC DCSCD, to Commander, Logistics Center, 4 November 1974, subj: Study: Division Logistics Organizational Structure (Project 16-78).

The first DLOS SAG convened on 18 December 1974 in Larkin Hall, Fort Lee. In his introductory remarks, MG Graham stressed the need for a management center for logistics in the division. He also emphasized the need for direct support maintenance to be customer oriented; i.e., supported elements should receive DS support, as far as possible, with single point service provided. MG Graham suggested that the SAG investigate maintenance at the division level. What should be done at the division level as opposed to the general support maintenance level or in the forward areas by contact teams? Additionally, he asked that the SAG analyze the forward areas support coordinating office which was authorized in airborne and air assault divisions to coordinate and control support activities in the brigade areas.<sup>29</sup> The SAG approved, with minor changes, the draft study plan. Six "strawman" division logistics structures were presented on viewgraphs and discussed by participants. The SAG chairman requested that comments/changes to these structures, along with any additional proposals, be forwarded to the Logistics Center no later than 15 January 1975.<sup>30</sup> The specific objectives of the study, as included in the final study plan, were:

- (1) Reduce nonessential layering within the division logistic structure.
- (2) Eliminate any duplication of functions among DISCOM headquarters, logistic support units, and division headquarters.
- (3) Improve wherever possible the effectiveness and efficiency of logistic service and support to combat elements of the division.
- (4) Reduce personnel and other resource costs of division logistics.
- (5) Identify cost and personnel space savings of alternatives recommended.
- (6) Determine the organization and capabilities of the DISCOM when an assured air line of communication (throughput) is employed.<sup>31</sup>

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<sup>29</sup>MFR, ATCL-CC, Study Advisory Group (SAG) Minutes, Study: Division Logistics Organizational Structure (Project LEAP, Issue 128), 18 December 1974.

<sup>30</sup>Ibid.

<sup>31</sup>Draft Study Plan, ATCL-CC, Combat Development Study Plan: Division Logistics Organizational Structure (Project LEAP, Issue 128), 3 January 1975.

The draft study plan was forwarded for approval in January 1975, and was approved by the DA DCSLOG on 26 March 1975.<sup>32</sup> However, as a result of additional information provided by TRADOC Headquarters, the original six "strawman" division logistics structures were expanded to eleven. These eleven were reviewed by representatives from Logistics Center directorates on 25 February 1975, with the result that a recommendation was made to the SAG that four structures be analyzed in detail. An IPR was conducted through correspondence with the SAG. While all SAG members concurred with a revised milestone schedule, there was a recommendation that a fifth structure be subjected to detailed analysis. Consequently, this structure was also included in the study plan.<sup>33</sup> Unit Reference Sheets (URS) were then developed by the SAG for each of the five structures.

In August 1975, the second IPR was held at the LOGC. At this meeting, the Study Advisory Group selected three alternative organizational structures for further consideration. Unit Reference Sheets were prepared for each of the alternative organizational structures, and they were evaluated by the Scenario Oriented Recurring Evaluation System (SCORES) in January 1976. The results of the SCORES evaluation were analyzed, and a third IPR was conducted by correspondence in April 1976.

The DLOS draft study report was prepared in May 1976. The study reaffirmed the validity of the current command and control structure in the Division Support Command. Significant recommendations included the establishment of a Missile Support Detachment in lieu of the Missile Support Company (presently an organic unit of the Division Maintenance Battalion), incorporating the Forward Area Support Coordinator (FASCO) in the AIM divisions, adding a three-man Graves Registration Team, and adding four keypunch operators in the DMMC. Even though the study recommended adding 22 personnel to the DISCOM, there would still be an overall savings in personnel spaces because of reductions in administrative areas. A total savings of 383 personnel spaces would be realized in a 16 division force whenever the recommended organization structure is implemented. The final draft study report was approved by the Deputy Commander, LOGC, and forwarded to TRADOC on 16 September 1976.

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<sup>32</sup>Ibid.; Ltr, DALO-PLD, BG Richard H. Thompson to Commander, TRADOC, 26 March 1975, subj: Study: Division Logistics Organizational Structure (Project LEAP, Issue 128).

<sup>33</sup>Ltr, ATCL-CC, COL Herbert T. Casey, Jr., 28 April 1975, subj: Study: Division Logistics Organizational Structure (Project LEAP, Issue 128).



One point that was not addressed in the study, but which was of concern to the Logistics Center and was included in the letter of transmittal was staff supervision and control of the Division Data Center (DDC). This subject was raised during a detailed review of the DLOS study by BG Vuley in late summer, 1976, too late to be considered by the DLOS SAG. The current guidance from the Department of the Army stated that the DDC was organic to the HHC, DISCOM, for command purposes, but was under the operational control of the Division Chief of Staff. The LOGC recommendation was that the OIC of the DDC have the additional duty of MISO but operate under the full command of the DISCOM.

Division Restructuring Study (DRS). There were two main reasons for the initiation of a Division Restructuring Study in mid-summer 1976. First, the Army was gaining a new family of weapons systems which were quite expensive, but very effective. Problems needed to be solved relating to training, replacement procedures, and supply and maintenance operations. Second, new tactical doctrine for modern warfare had been promulgated in Field Manual 100-5. The basic question was could a division from the 1960s fight with the new weapons and doctrine? Reorganization was seen as a means of providing for the optimum effectiveness of the new weapons systems and the new tactics.

The DRS methodology involved a mix of military judgment and cost-operational effectiveness analysis. The methodology was divided into three parts: a historical overview of the development of US Army divisions, emphasizing the fact that more firepower was coming from the rear than formerly; an analysis of the new weapons systems programed for the Army inventory for the period 1980-85; and a consideration of the impact of new doctrine, as articulated in FM 100-5. Foreign Army organizations were also studied in order to draw comparisons. Finally, problem areas in current US Army organization were identified.<sup>34</sup>

In early June 1976, the TRADOC Commander provided the following guidance regarding the Division Restructuring effort:

1. Alternative organizations will be developed that provide a clear choice.

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<sup>34</sup> Colonel John W. Foss, Colonel Donald S. Pihl, and LTC Thomas E. Fitzgerald, "The Division Restructuring Study: The Heavy Division," Military Review, LVII, 3, (March 1977), 13.

2. Maintenance, administration, and mess were to be elevated to the battalion level (CABL study).
3. Anti-tank guided missile elements were to be elevated to company level.
4. A common base between tank and mechanized battalions must be established.
5. Identifiable company maintenance teams must be in the battalion maintenance platoon.
6. Tank companies are to have eleven tanks in each company, three tanks per platoon.
7. The maintenance vehicle for the maneuver company should be tracked and armored.
8. An armored rearm/resupply vehicle should be included in the battalion supply section for each company.

In response to this guidance, representatives from the Logistics Center and the associated schools met during the latter part of June 1976, and developed an Armor Division Support Command. This specimen organization was created in response to the combat arms input and was based upon known or anticipated weapons systems and densities of equipment. It established the support philosophy recommended for the 1980-85 time frame.

During the period July-September 1976, the combat service support concept was formulated, coordinated between the LOGC and TRADOC commanders, and completed. The Combined Arms Combat Development Activity conducted a high resolution (Dunn-Kempf) wargame to evaluate the alternative organization. Results of this evaluation were expected in October. Also, a low resolution wargame (Jiffy) was begun by the Combined Arms Center in September for the same purpose. Meanwhile, the Logistics Center and proponent schools began to develop the TOEs for the restructured organization.

Colonel John Foss, Director of the TRADOC Division Restructuring Study Group, gave a preview of the new concept in a news story published in August 1976. Tank companies and platoons would reduce the number of tanks from 17 to 11 and 5 to 3, respectively. However, because of an increase in the number of units, there would be parity of tanks in both

the new and current division. Turning to mechanized infantry battalions, they would have a common basic structure with tank battalions, which would simplify the cross-attachment of units for specific combat tasks. The planned infantry battalion would also have "pure" rifle companies, without mortars and TOW anti-tank weapons. The TOW would be located in an anti-tank company coordinated and controlled at the battalion level. The increase in artillery tubes was seen by Army planners as making mortars unnecessary in the rifle companies. In another anticipated change, the division would get six CH-47 helicopters, measurably increasing its air resupply capability.<sup>35</sup> In short, each division would have smaller, more agile maneuver units, but more of them per division.<sup>36</sup>

Logistics Echelons Above Division in USAREUR (Project LEADER) and Modernization of Logistics-1977 (MODLOG-77). On 11 July 1974, representatives from the Office of the Deputy Chief for Logistics, DA, and Headquarters, USAREUR and Seventh Army, agreed on a four-phased concept plan for implementing echelons above division logistics doctrine in USAREUR. Phase I involved actions to be accomplished as quickly as possible. Phase II were actions to be taken on a phased basis to improve operations within peacetime constraints and provide a base for transition to wartime posture. Phase II included those actions to be taken during the transition from peacetime to wartime, and Phase IV were actions to be taken during war.<sup>37</sup> From the beginning, the Logistics Center worked with USAREUR to implement Project LEADER.

However, the LOGC and USAREUR had several disagreements on the way to achieve their common goal. One conflict developed soon after the signing of the concept plan. The Department of the Army had directed that the Theater Army Support Command (TASCOM) be merged with the Theater Army Headquarters (TAHQ). The Logistics Center's approach was to combine TASCOM and Theater Army Headquarters, eliminate the US Army

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<sup>35</sup> Msg, DAPA-CT, Department of the Army, 241500Z August 1976, subj: Proposed Army Division Reorganization.

<sup>36</sup> Foss, et al., "Heavy Division," p. 13.

<sup>37</sup> MFR, AEAGD-S, MG J. L. Klingenhagen, MG H. B. Gibson, Jr., MG E. J. D'Ambrosio, BG R. H. Thompson, 11 July 1974, subj: Concept Plan for Logistics Echelons Above Division in USAREUR (Project LEADER).

Materiel Management Agency, Europe (USAMMAE), and phase down depots to GS operations. The major difference with USAREUR was that the USAREUR approach did not phase out the USAMMAE until the transition to wartime posture. Indeed, Logistics Center personnel were dismayed that Phase I of the USAREUR plan seemed to strengthen rather than weaken the role of the USAMMAE.<sup>38</sup> The Logistics Center position was supported by both the Combined Arms Center and the DA DCSLOG, while some of USAREUR's reservations were shared by USARPAC.<sup>39</sup>

A related issue was one dealing with the requirement to streamline supply stockage in Europe. Both the Logistics Center and DA DCSLOG encouraged USAREUR Headquarters to reduce the proportion of resources devoted to administrative support as soon as possible. It was stressed that this streamlining need not wait until the total plan is complete. Indeed, as the DA Deputy Chief of Staff for Logistics noted, "... decisions on alternative logistics organizations and supply distribution systems will depend on the extent to which stockage can be further streamlined."<sup>40</sup> Colonel Bice, Director of Systems Design Directorate, pinpointed the problem: "In general, USAREUR's comments are based on the today, real life, on-the-ground situation within which USAREUR currently operates. Doctrine should reflect a visualization of combat requirements and not the restraints that are imposed by peacetime economic restraints."<sup>41</sup> USAREUR headquarters, in responding to the concerns raised by the Logistics Center and DA DCSLOG, agreed that the streamlining of supply stockage need not be deferred until structural planning was complete; further, USAREUR enumerated the actions it had

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<sup>38</sup> Fact Sheet, ATCL-CC, LTC Mills, 30 July 1974, subj: Merger of Theater Army Headquarters (TAHQ) and Theater Army Support Command (TASCOM) Headquarters.

<sup>39</sup> DF, ATCL-CC, COL Herbert T. Casey, Jr., 13 August 1974, subj: Re-evaluation of Theater Army/TASCOM Organizational Doctrine; Msg, ATSW-LG, CDR, USACAC, 161420Z August 1974, subj: Re-examination of Theater/TASCOM Organizational Doctrine.

<sup>40</sup> Msg, DALOGMS-P, DA to CINCUSAREUR, 131835Z August 1974, subj: Streamlining Supply Stockage in USAREUR.

<sup>41</sup> DF, ATCL-SCC, COL Bice to Director, Concepts and Doctrine, 22 August 1974, subj: Reevaluation of Theater Army/TASCOM Organizational Doctrine.



taken in previous months to reduce supply stockage. USAREUR Headquarters did express some concern over the input being used by the General Research Corporation in developing, under contract, a model which was to aid in determining the optimum COSCOM stockage criteria, the supply management responsibilities of the COSCOM versus the USAMMAE, requisition flow, and the level to which USAMMAE stocks were to be reduced. The opportunity was requested of reviewing the data being used by the General Research Corporation for its model.<sup>42</sup>

Many of the conflicts between the TRADOC (LOGC) position and that of USAREUR were resolved at a Project LEADER planning meeting held in Heidelberg, Germany, from 23-27 September 1976. Colonel Casey, Director of Concepts and Doctrine, who was accompanying MG Graham on his trip to Europe, served as the Logistics Center representative at this meeting. Colonel Evans, Chief of Plans, USAREUR/DCSLOG, presented the USAREUR position at this meeting. His headquarters felt that it was necessary to fill NORS requisitions from prepositioned war reserve and project stocks to maintain a high degree of materiel readiness; there was a continued need of USAMMAE ICC and central stockage point (depot) for handling station returns and excesses; and there was a need for a USAMMAE ICC to maintain control over all theater requisitions for management and funding under the USAREUR Command Channel Stock Fund. "In short," as Colonel Casey noted, "the USAREUR position as briefed was contrary to the proposed TRADOC EAD doctrine and Phases II through IV of Project LEADER as set forth in the 11 July 1974 agreement."<sup>43</sup> As progress was slow in resolving the conflict, it was decided to have an interview with Major General H. B. Gibson, Jr., the USAREUR DCSLOG. MG Gibson was assured that many of his reservations could be accommodated within the framework of the proposed doctrine. In turn, he conceded that a full theater ICC capability was not essential. After this discussion, USAREUR's position was revised. While there still remained some outstanding issues, the new position was substantially the same as TRADOC's.<sup>44</sup> Shortly thereafter, the Office of DA DCSLOG published a detailed draft plan for accomplishing Phases I and II as expressed in the July 1974

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<sup>42</sup>Msg, AEAGD-RO-D, CINCUSAREUR to DA (DALO-SMS-R), 261834Z August 1974, subj: Streamlining Supply Stockage in USAREUR.

<sup>\$</sup>MFR, ATCL-C, COL Casey to CG, USATRADOC, 2 October 1974, subj: Trip Report, Project Logistics Echelons Above Division in USAREUR (LEADER).

<sup>44</sup>Ibid.

agreement.<sup>45</sup> With necessary changes made, this plan was substantially accepted by USAREUR as its guide to implementing Project LEADER.

The Commander in Chief, United States Army, Europe (CINCUSAREUR), however, did reserve some decisions regarding personnel resources to be used to strengthen COSCOMs because of high priority requirements associated with increasing combat power in Europe. This was a particularly sensitive issue because of the Nunn amendment which had passed Congress the previous August and which required a reduction of 18,000 troops in the "noncombat component" of the United States Army in Europe.<sup>46</sup> The Commander in Chief also required that the COSCOMs, including GS units and MMCs, be manned with military personnel. Therefore, USAREUR stated that it required DA support for additional manpower spaces to implement Project LEADER. However, the Department of the Army took the position that personnel requirements for Project LEADER must be acquired within current manpower resources.<sup>47</sup>

In early September 1975, USAREUR Headquarters established a committee, chaired by the Deputy CINC, to spearhead a comprehensive program aimed at modernizing USAREUR logistics. The target date for completion was 30 September 1977. Hence, the program became known as MODLOG-77. It drew heavily on what had already been accomplished under Project LEADER, but its goals were more ambitious than those of LEADER. Additionally, a General Officer Executive Committee, comprised of representatives from DA, USAREUR, DARCOM, DSA, and TRADOC (LOGC), was formed to assure a coordinated concept plan and timely execution of actions. This committee met four times between September 1975 and September 1976.

The broad objectives of the program were to (1) streamline USAREUR logistics structure and operations, (2) increase reliance on CONUS, and (3) increase host nations and contractual support. In support of these

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<sup>45</sup> Ltr, DALO-PLD, BG R. H. Thompson, Director of Logistics Plans, Operations and Systems (ODCSLOG), 8 October 1974, subj: Plan to Implement Logistics Echelons Above Division Doctrine in Europe (Project LEADER).

<sup>46</sup> Fact Sheet, ATCL-CC, Acting Director, Concepts and Doctrine, 3 July 1975, subj: Project Leader Update; Public Law 93-365, 5 August 1974.

<sup>47</sup> Fact Sheet, ATCL-CC, Acting Director, Concepts and Doctrine, 3 July 1975, subj: Project Leader Update.

objectives, various tasks and subtasks were to be accomplished. TRADOC (LOGC) interest focused on three: establishing an air line of communications (ALOC) for repair parts, establishing a GS capability within the corps, and implementing SAILS in Europe. At the general officer meeting held on 26-27 July 1976, lengthy discussions were held which related to the Logistics Center's primary areas of interest. It was agreed, first of all, that a study group would be established and chaired by the DA DCSLOG that would define the echelons above division problem. Major areas of the study would include the following: the USAREUR logistics posture in peace and war and how the transition would be made; stockage levels and stratification in peace and war; management of war reserve stocks; functional versus area commands; and the delivery of DSS to DSU and GSU in wartime. The study was to be conducted in two phases. Phase I was completed in August and sent to the principals in mid-September for staffing and comment. Phase II was to deal with transportation and functional versus area commands. The transportation section was to begin in November.

SAILS was also discussed in the general officer meeting. The pre-conversion survey of VII Corps had been completed, and related administrative tasks were underway. Training of VII Corps personnel was to begin on 14 September, and actual conversion to SAILS in VII Corps was to commence in mid-October. The corps expects to be operational on SAILS by mid-November 1976. USAREUR expressed a desire to have an ABX package at the theater level in addition to the scheduled A- package. Both USAREUR and the general officer study group were to examine this requirement.

Base Development Program. During the operations in Southeast Asia, it became apparent that construction planners did not have the techniques and guides needed for efficiently laying out and anticipating resource requirements for constructing and maintaining base camps. It also became apparent that a tremendous volume of material was being shipped into the Theater of Operations which placed an operational burden on the Army and did not necessarily provide what was needed for construction and maintenance activities. Staff officers, planning to the best of their abilities, often found problems after the base camps were constructed that could have been avoided with more guidance during the planning stages. Army literature, used by training personnel in the various aspects of base construction, reflected techniques developed during World War II. In many cases, quantitative data were approximations derived years ago but never validated or revised to reflect current requirements. Army experience since World War II had been unique in that it had had the advantages of air superiority. The effects of air threats on base construction, therefore, had not been considered in the literature. Each branch of service, moreover, had been constantly striving to improve its own efficiency without, in many instances, considering the engineering problems caused by these improvements.

In the 1970s, the Army was faced with pressures to reduce expenses and manpower, while participating in contingency planning for operations in underdeveloped areas without deep water ports, adequate water supplies, and requiring air superiority which utilized high levels of resources. Therefore, the Base Development Program was developed by the Engineer School to develop a methodology for planning base construction in a Theater of Operations, to evaluate the CE capability to meet construction and maintenance requirements, and to identify equipment or techniques from commercial industry or research needed to overcome identified deficiencies.

The Logistics Center was designated the TRADOC focal point for base development. Eight substudies were prepared by the Engineer School and coordinated with the Logistics Center during 1975-76. During FY 76, the initial drafts were reviewed and the final drafts prepared. In addition, an Executive Summary was prepared by the Engineer School. The studies themselves were done by two contract agencies, the Waterways Experiment Station and the Construction Engineer Research Laboratory. All of the studies encountered problems. Since the TRADOC SCORES scenarios had not been established, scenarios had to be developed which required considerable time. Also, the emphasis was still on the long-range aspects of base development rather than on a short war (60 days). Finally, the funding was very austere. The eight substudies, with their basic recommendations, were as follows:<sup>48</sup>

a. Port Construction: The aim was to have a mobile pier available by D+90 that would be capable of handling non-self-sustaining container-ships. The study recommended an adaption of an off-shore oil platform. It did not concentrate on the beach and shore requirements as concepts and equipment had not been finalized.

b. Vertical Construction: The study reviewed the advantages of pre-fabricated construction and basically recommended further efforts to procure pre-fabricated products.

c. Horizontal Construction: The study developed a formula that could be used to estimate construction time. It pointed out the current lack of capability to handle all of the horizontal construction requirements that could be expected.

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MFR, ATCL-CLT, COL D. R. Werner, Director, Concepts and Doctrine, to DCG, LOGC, 7 October 1976, subj: Engineer School Base Development Studies.



d. Electrical Power Generation and Distribution: The study recommended that tactical generators be eliminated in base camps by D+60 and conversion be made to central power.

e. Centralized Water Production, Distribution, and Disposal: The study pointed out the current shortfalls that the engineers have to handle distribution and disposal. While not recommending any specific solutions, the study did present several ideas on conserving and recycling water.

f. Base Maintenance: The study developed a methodology for determining equipment, materiel, and personnel required for base maintenance.

g. Base Protection. The study basically reviewed what the Army currently has in the way of fences and bunkers. This study was inadequate.

h. Base Design: This study developed a methodology on designing a base camp. The methodology involves the establishment of a TOE data bank. The Office of the Chief of Engineers was (FY 7T) investigating letting a three year contract to have such a bank created.

The studies were to be presented to MG Graham at a decision briefing in August 1976, but the briefing was delayed until October. Concepts and Doctrine Directorate recommended that all the studies be approved.<sup>49</sup>

#### Doctrinal Literature

The Army Facilities Component System (AFCS). The AFCS is a series of technical manuals which describe military facilities and installations; provide construction/design drawings; and compile facilities, costs, and bills of material. The AFCS is managed by the Office of the Chief of Engineers (OCE) and is responsive to the requirements of all major Army commands. As the designated TRADOC proponent for AFCS, the Logistics Center was requested by the OCE, in January 1975, to provide detailed requirements on port facilities. The Transportation School hosted a two-day working conference on 22-23 July, at which time the initial criteria were provided to the OCE. On 15 January 1976, the OCE was notified to proceed with the formal design preparation after a review was conducted on the OCE report which summarized the results of the conference. Also, during FY 76, the Logistics Center initiated the required annual review of the AFCS. TRADOC school comments were consolidated and forwarded to TRADOC on 28 January 1976.

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<sup>49</sup> Ibid., Inclosure 1.

Fm 55-19/AFR 76-17, Support of Contingency Forces by Air Lines of Communication. This project carried over from FY 75, with work performed by action officers from the Tactical Air Command, Military Airlift Command, US Army Transportation School, and the Logistics Center. The final draft was delivered to the AG publishing center in June 1975. When TAG requested the Air Force Staff to provide distribution requirements, the Air Force withheld approval until 13 February 1976. The publication was printed and distributed in May 1976.

FM 54-6, Theater Army Area Command (TAACOM). On 1 December 1975, FM 54-6 was designated as a major project. The preliminary draft was produced and distributed for LOGC review on 7 May 1976. Comments and recommendations received from the review were incorporated, and the coordinating draft was prepared for production by the field printing plant.

FM 54-23 TEST, Materiel Management Center, Corps Support Command. This was the first field manual produced by the Logistics Center and associated schools under the new "camera-ready" preparation of the Army-wide training literature program. The complete text and camera-ready mechanicals were prepared by the Logistics Center and coordinated with all LOGC directorates. The camera-ready mechanicals were completed in accordance with TRADOC Circular 310-5 and on 12 March 1976 were hand-carried by the project officer to TRADOC where publication procedures were initiated. FM 54-23 TEST was published on 3 May 1976.

FM 54-2, The Division Support Command and Separate Brigade Support Battalion. A worldwide field review was completed in FY 76, and all comments were accepted or resolved. The final draft was updated with current doctrine and organization and was prepared in accordance with the guidance of the Deputy Commander, LOGC. On 17 May 1976, final draft printing was completed by field printing and, with accompanying art work, was forwarded to the AG Center in Washington for publication. Copies of the final draft were also distributed to all reviewers of the initial draft.

FM 71-100, Division Operations (Armored and Mechanized). On 14 May 1976, the Logistics Center was tasked by the C&GSC, Fort Leavenworth, Kansas, to provide combat service support input to this "How-to-Fight" manual, specifically to the systems, offense, defense, and retrograde chapters. Initial input was to be to the systems chapter. On 14 June 1976, a draft of the input to this chapter was hand-carried to the field manual team at Fort Leavenworth. Although the LOGC input to the CSS section was accepted verbatim, the addition of the submission from the Administration Center necessitated a rewrite of portions of this section. A final draft was received on 30 September and distributed within the LOGC for review and comment.

FM 100-5, Operations. In June 1975, TRADOC tasked the Logistics Center to prepare a chapter on combat service support for FM 100-5. In all, ten versions of the chapter were prepared, although several involved only minor revisions. The final draft became chapter 12 of the manual. FM 100-5, which is the capstone publication of the "How-to-Fight" series, was printed in June 1976.

FM 54-9, Corps Support Command. The final draft was completed during FY 75 and submitted to the AG publishing center for printing and distribution in June 1975. Publication was suspended twice to update doctrine on Combat Oriented General Support and on ammunition procedures. In January 1976, DA DCSLOG finally authorized publication. The manual, dated April 1976, was printed in May, distributed in June, and was almost immediately in need of revision. Change 1 to FM 54-9 dealt with logistic support for a contingency force. It was originally intended to be a separate manual on the organization and operations of a Force Support Command (FOSCOM) in support of an independent contingency force. However, with the decision to eliminate the FOSCOM in favor of a tailored COSCOM, the manual was tied to FM 54-9. Since other changes had to be made in FM 54-9, it was planned to include the subject "Logistics Support for a Contingency Force" in a complete revision of that manual.

FM 54-10, Logistics--An Overview of the Total System. In July 1976, Concepts and Doctrine Directorate was tasked to develop a change to FM 100-10, Combat Service Support, which would include an overview of the complete logistics system. The next month, however, additional guidance was provided which indicated that MG Graham desired to publish a completely new manual rather than simply a change to FM 100-10. This would make the material more visible and allow treatment of the subject in more the manner and style of FM 100-5. Consequently, work proceeded on an entirely new manual during FY 7T.

FM 54-7, Theater Army Logistics. Efforts to revise this manual in accordance with the DA approved Echelons Above Division doctrine were begun in the first quarter of FY 76. An initial draft manuscript was forwarded to the Logistics Center directorates in September 1975. Comments were incorporated where appropriate, and the coordination draft was forwarded for field review in early January. Comments and recommendations were requested by 1 March 1976; however, they were not submitted by the requested date. On 29 March 1976, a message was dispatched to the tardy reviewers requesting submission of comments or negative replies. All comments were not received until May. The delays in receiving comments caused the scheduled completion date to slip from FY 76/4 to FY 7T. On 4 June 1976, the final draft manual was submitted to Headquarters of the Department of the Army and TRADOC Headquarters for approval.

FM 71-101, Division Operation (Infantry, Airborne, and Airmobile). The Logistics Center was tasked by the C&GSC on 21 September to develop the logistics portion of combat service support systems to be used in chapter 4, using the CSS section developed for FM 71-100 as a guide for both format and content. The plans were to distribute a draft of this logistics portion for review by members of the Logistics Doctrine Management Review Board in accordance with LOGC Memo 15-6.

FM 100-10, Combat Service Support. The final draft of FM 100-10 was forwarded to the TAG for publication in FY 75-4. At that time, information copies were provided DA DCSLOG and HQ, TRADOC. The DA DCSLOG postponed publication in order to perform an extensive review throughout the Department of the Army Headquarters. The manuscript, along with DA comments, was then returned to TRADOC, where a review of the manuscript and comments was performed. Comments from both DA and TRADOC were then received by the Logistics Center in October 1975. Where there were approximately 130 comments, they had little doctrinal significance. The DA Deputy Chief of Staff for Logistics indicated, however, that material in the manual dealing with COGS had to be deleted. After weeks of discussion, he finally relented; and the manual was released for publication containing the COGS material. There were still further delays in order to incorporate changes in ammunition terminology. These changes were completed in FY 76/3. In the fourth quarter of FY 76, the manual was published and distributed. The publication date on the manual was 30 April 1976.

TC 54-1, Contingency Planning: Logistics. This publication was initiated in August 1975 by direction of the Commanding General, TRADOC. In September 1975, the LOGC Commanding General approved the approach, scope, and topical outline. It was to be a general commander's guide for contingency planning. In October, the TRADOC Commanding General redirected the approach and scope toward a detailed procedural guide to plan for the logistic support requirements for a contingency force based on density of weapon systems. The Operations Analysis Directorate was tasked to provide the Concepts and Doctrine Directorate with operations research methodologies which would serve as a basis for the prescribed planning. In May 1976, MG Graham instructed Concepts and Doctrine to devise a procedure for contingency planning and Operations Analysis to provide operations research support. During FY 7T, Concepts and Doctrine developed the logistics planning procedure that will provide a time-phased schedule for the deployment of logistics units, materiel, and supplies required to support an expanding contingency force. The procedure was dependent upon requirement determination methodologies which were still being developed by Operations Analysis and Concepts and Doctrine Directorates. These methodologies were based upon the densities of consuming systems.



FM 54-2, The Division Support Command and Separate Brigade Support Battalion. The typing of the first initial draft was completed during FY 75/1 and submitted to appropriate elements within the Logistics Center for review. Comments, as appropriate, were incorporated into the draft. Printing was completed during the third quarter of FY 75, and the manual was distributed for field review on 7 February 1975.

FM 55-19 TEST, Support of Contingency Forces by Air Lines of Communication (New). This publication was a compendium of 64 publications (Army, Air Force, and joint services). It was written in narrative form describing functions required at all levels of command for all phases of airlift operations in support of a combat force. It referenced existing publications which contained detailed doctrinal procedures. The manual was prepared in rough draft through a joint effort of the Logistics Center, Military Airlift Command, Tactical Airlift Command, and Transportation School personnel. After the draft was coordinated with those agencies, as well as with FORSCOM and TRADOC, comments were consolidated, an editorial rewrite was done, and the final draft was forwarded to the TAG Center for publication in June 1975.

Logistics Doctrine Management Review. On 28 May 1976, the Deputy Commanding General of the Logistics Center directed that a management review be conducted within the Center "that identifies the status of applicable FMs and TOEs in the categories of division logistics (DISCOM), corps logistics (COSCOM), and COMMZ logistics ..."<sup>50</sup> The Director of Concepts and Doctrine was designated the "lead director" for the review. Results of the review were presented to BG Vuley on 10 August 1976. At that time, the DCG directed that a "murder board" be established to review principal doctrinal publications (i.e., selected FMs and TOEs). The board was to be created through the publishing of necessary LOGC policy and procedural requirements. Membership was to consist of the DCG (chairman), Chief of Staff (alternate chairman), Scientific Advisor, Technical Advisor, Chief of Project CAR, and all Directors. This board became known as the Logistics Doctrine Management Review Board. It held its first meeting on 23 November 1976.

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<sup>50</sup>MFR, ATCL-DCG, BG Vuley, 28 May 1976, subj: DCG Management Review of Logistics Doctrine.

### III

#### REPAIR PARTS PROGRAM

The Logistics Center Repair Parts Program was an extremely high priority during the period 1974-1976. Its aim was to improve repair parts supply support to the Army during both peacetime and the transition period to wartime. In this program, related studies were performed as distinct entities with their own study plans. The LOGC Repair Parts Program Study Advisory Group met on 2 October and 20 November 1974, in order to coordinate the various Repair Parts Program projects within the Center. Also, representatives of the Logistics Center met with those from the Army Materiel Command on 1 November 1974, in order to coordinate the LOGC Repair Parts Program with related actions being taken by the Secondary Item Division within the Materiel Command's Supply Directorate. An additional meeting for that purpose was held at Alexandria, Virginia, on 12-13 December 1974.

On 18 November 1974, General Graham directed that a Repair Parts Division be established in the LOGC Materiel Directorate; and, on 1 January 1975, this was accomplished, although TRADOC approval of the TDA was still pending. The proposed TDA recognized a requirement of four military and three civilian spaces, but only two of the three civilian spaces were authorized for hiring purposes. By 31 March 1975, three of the four military spaces had been filled and recruiting action had begun to fill the two authorized civilian spaces. In January, a TRADOC Manpower Survey Team supported the proposed seven spaces and recognized the possibility of future expansion within the Division.

TRADOC tasked the Logistics Center, on 2 January 1975, to perform a DA directed study related to PLL Consolidation/Elimination (Project LEAP, Issue 117). A draft study plan was distributed for comment on 25 February, and the study plan was approved at the first SAG meeting on 19 March 1975. The next day the Repair Parts Division became involved in yet another project when the Army Materiel Command presented a briefing on the USATACOM Supply and Maintenance Team Engineer Equipment and Support Evaluation. Soon after General Vuley came to the Logistics Center, in the summer of 1975, he indicated that the Logistics Center would be willing to work on a joint TRADOC/FORSCOM/DA team, and he directed that the Logistics Center work together with AMC to refine required actions by DA/AMC/FORSCOM/TRADOC.

The Repair Parts Division distributed two important publications on 16 January 1975. One was the Bibliography of Repair Parts Studies, a three volume work prepared by the General Research Corporation in partial fulfillment of a FY 74 Logistics Center Repair Parts Program Contract. The other was Repair Parts References, which had been published in November 1974, by the Repair Parts Division in conjunction with the Army Construction Equipment Repair Parts Project.

Among the studies related to the Repair Parts Program was the Maintenance Support Planning--Transition to Wartime project. Its purpose was to develop a methodology for forecasting repair parts and maintenance requirements for planning and application during the early stages of contingency force deployments. The initial effort used the 2-1/2-ton and, subsequently, the 5-ton truck as the representative test-bed vehicle. A joint working group was established for the project and was used extensively.

As a result of a joint working group meeting at the Army Tank-Automotive Command in July 1974, a preliminary wartime Maintenance Allocation Chart (MAC) for 120 5-ton trucks, as utilized in ME-1 (SCORES) was developed. This use profile served as a base for the collection and development of data relating to repair parts, personnel, and man-hour requirements. Initial projects were continually refined and compared with other existing data bases. For example, the Army Materiel Systems Analysis Agency (AMSAA) conducted a comparative analysis of the data developed by the joint working group and other data generated by AMSAA's economic life study of the 5-ton truck. Within the Logistics Center, the Operations Analysis Directorate applied MAWLOGS models to process data generated by the joint working group. Initial analysis of the results of this effort in the fall of 1974, indicated that the current planning system needed to be modified. A deferred maintenance concept needed to be included, and more realistic, smaller, and less costly PLLs and ASLs were required. Based on pre-LOGCAB briefings and a 21 November 1974, meeting between himself and members of the joint working group, General Graham directed the 5-ton truck study to include baseline and intermediate models so that comparisons could be made with the concept of wartime maintenance. This enlarged study effort allowed materiel and item input from the study of the 5-ton truck to be used to determine the optimum "tooth to tail" ratio.

In the course of a 20 January 1975, briefing by the Ordnance Center and School (OC&S) to General Graham on the Maintenance Standards Study (authorized by the LOGC Deputy Commander and assigned to the OC&S on 10 September 1973), the need was discussed of having the Logistics Center and the OC&S develop a common methodology and analytic technique. It was decided that joint staff actions would redirect the effort as appropriate. On 30 January, at the Headquarters of the Army Materiel Command, a joint working group of LOGC and OC&S representatives reviewed data input and output requirements for use in MAWLOGS simulations. It was determined that the M60A1 tank had a suitable data base for use with MAWLOGS. Subsequently, the Logistics Center study on Maintenance Support Planning was merged with the Ordnance Center and School Maintenance Standards Study, and the development of data worksheets for use in MAWLOGS simulations was continued.

The OC&S prepared MACs and supporting stockage lists for comparison with the baseline model. Such comparisons assisted in measuring effects of various reduced maintenance standards and changes in echelon of maintenance tasks on operational availability. A coordination draft of the Maintenance Standards Study was completed and sent to appropriate organizations in July 1975. It was approved by Headquarters, TRADOC on 23 March 1976, and forwarded to DA ODCSLOG for approval and establishment of appropriate tasking on 24 June 1976. An information copy was provided to the DARCOM DCDR for Materiel Readiness.<sup>1</sup>

Following the presentation of the repair parts major program objective quarterly update on 17 March 1975, General Graham directed that another project, number 14, be added to the repair parts program. This project, which came to be known as the Wartime Repair Parts Consumption Planning Guide (WARPAC) project, was implemented to develop commodity oriented guides for use by field commanders to assist them in the determination of what repair part stocks were required in the initial stages of a contingency operation. The problem was that, in wartime, the management of repair parts becomes a difficult chore in that repair parts are by necessity "pull" rather than "push" type items; and, if demand history does not exist, it is difficult to formulate stockage lists (ASLs) for field units. These stockage lists are required for the period when the transition to a wartime condition is being made, in other words the time between peacetime use of equipment and the point when demands based on wartime equipment usage rates have been established. General Graham noted in a letter to Major General John H. Cushman, Commander of the US Army Combined Arms Center and Fort Leavenworth, that LOGCAB attendees had repeatedly stated that the military services need to develop a better, more systematic, approach to the identification of essential repair parts . . .

It would appear that such an approach would have to be based on the critical maintenance functions which, if not performed on a particular item of equipment, would impact adversely on mission accomplishment. The problem of determining critical maintenance functions and supporting repair parts becomes more pronounced when the field command must decide what parts he will stock for the transitional period from peace to war; that is, the period of time where the normal peacetime demand-based operation must be supplanted by a wartime demand history, based on wartime equipment usage rates. Currently, the

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<sup>1</sup>MFR, ATCL-MR, A. D. Mills, MPOC, Repair Parts Program, 17 Dec 76, subject: WARPAC Phase III.



field commander does not have the necessary tools to assist him in his determination of what parts, in what quantity, should be stocked for contingency operations.<sup>2</sup>

It was decided that repair parts consumption planning factors would be developed jointly by TRADOC and AMC on selected maintenance significant, mission essential, equipment items and systems for the organizational, direct support, and general support levels of maintenance. The selection of essential repair parts would be based on the application of the concept of wartime maintenance, which envisions performing only essential maintenance actions; i.e., a task which, if not performed, will render the end item or system incapable of performing its intended mission. The end result of the project would be commodity oriented user's planning guides which contained contingency maintenance allocation charts with supporting repair parts and instructions on the use of repair parts planning in support of contingency operations. It was anticipated that the initial guides would be refined and updated annually until guides are developed on a total of 50-60 equipment end items or systems. Within 2 years after publication of interim guides, it was projected that the procedure would become Army policy. In July 1975, the identification of the first 12 items for the WARPAC project was completed, and work commenced at the appropriate schools and agencies to develop Contingency Maintenance Allocation Charts (CMAC) and Mission-Essential Maintenance Operations (MEMO) for publication as DA Training Circulars.

One of the systems to be included in the WARPAC project (Phase II) was the Improved HAWK Missile System. It was projected that the US Army Air Defense School (USAADS) would develop the "user" data and the Missile and Munitions Center and School (MMC&S) would provide "support" school data. A problem developed in June 1975, however, when the MMC&S responded that it could not undertake the project because manpower required other high priority tasks. Moreover, it was pointed out that the HAWK missile was only partially deployed and, therefore, had a limited data base from which to draw. In sum, the MMC&S recommended that the system be deleted from the WARPAC project.<sup>3</sup> Nevertheless, after several communications between the LOGC and the MMC&S, the MMC&S

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<sup>2</sup> Ltr, ATCL-MRP, MG Graham to MG Cushman, 22 April 1973.

<sup>3</sup> Ltr, ATSK-CTD-PC, MAJ Harold J. Hicks, MMCS, to Commander, US Army Logistics Center, ATTN: ATCL-MR, 4 June 1975, subj: Wartime Repair Part Consumption Planning Guide Project, ACN 23300.

reevaluated its position and, at the beginning of November, concluded that the study was "of such significance as to warrant diversion of resources necessary to accomplish the required tasks."<sup>4</sup>

Meanwhile, COL Woods, the Major Project Objective Coordinator (MPOC) for Repair Parts, had requested the TRADOC Liaison Officer to USAREUR to investigate the possibility of the 32d AADCOM (USAREUR) doing the Improved HAWK analysis. On 13 August, the TRADOC Liaison Officer advised COL Woods by telephone that the G4 32d AADCOM desired to do the analysis. During the telephone conversation, it was agreed that an effort should be made to develop a collaborative effort between the 32d AADCOM and USAADS.<sup>5</sup> However, the Air Defense School, it soon became apparent, was reluctant to get involved. In November 1975, and again the following March, it responded negatively to requests from the Logistics Center for assistance. The arguments were similar to those used by the MMC&S: the Improved HAWK was only partially deployed, and other high priority tasks claimed most of the available manpower.<sup>6</sup> In the middle of March, COL Van Auken, Director of the Materiel Directorate, called COL Bodine of the AADS. He requested that the Air Defense School reconsider its position, and he offered it resources to do the task.<sup>7</sup> A few days later, COL Carroll, the LOGC Chief of Staff, wrote to the AADS, "We cannot emphasize enough our need to have USAADS on board for this project. USAADS plays a vital role in the success of WARPAC as many

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<sup>4</sup>Ltr, ATSK, COL David C. Smith, Acting Commander, MMCS, to Commander, US Army Logistics Center, ATTN: ATCL-MR, 6 November 1975, subj: Wartime Repair Part Consumption Planning Guide for GM System: Improved Hawk.

<sup>5</sup>Fact Sheet, ATCL-D, COL C. A. Woods, 14 August 1975, subj: WARPAC Project -- Improved HAWK System.

<sup>6</sup>Ltr, ATSA-CD-MM, CPT James E. Record, AADS, to Commander, US Army Logistics Center, ATTN: ATCL-MR, 3 November 1975, subj: Wartime Repair Parts Consumption Planning Guide Project, ACN 23300; Ltr, ATSA-CD-MM, CPT James E. Record, AADS, to Commander, US Army Logistics Center, 4 March 1976, subj: Wartime Repair Parts Consumption Planning Guide Project, Phase II, ACN 23300.

<sup>7</sup>Ltr, ATSA-CD-MM, CPT Laurence J. Culling, AADS, to Commander, US Army Logistics Center, ATTN: ATCL-MR, 24 May 1976, subj: Wartime Repair Parts Consumption Planning Guide Project (WARPAC), Phase II, ACN 23300.

schools are dependent upon key data that can only be developed at Fort Bliss."<sup>8</sup> Finally, in May, the AADS, after restating its reservations about WARPAC, agreed to participate in the study "to the maximum permissible level commensurate with ADA weapon systems field status and available manpower."<sup>9</sup> Consequently, by May 1976, the LOGC, AADS, MMC&S, and the 32d AADCOR were cooperating on the Improved HAWK Missile System.

On 26 August 1975, an IPR on WARPAC was presented to General Graham by COL Woods, MPOC, Repair Parts Program. MG Graham approved publication of the WARPAC training circulars in a loose leaf format and, because of time constraints, authorized publication of the first twelve in draft form. The target date for completion of this phase was 31 December 1975. On 1 November 1975, all Phase I draft training circulars were presented to the Administrative Support Office for printing. They were distributed worldwide in early 1976, for review and comment. The guides contained "revised contingency Maintenance Allocation Charts for a particular end item, with mission essential and deferrable (for 120 days) maintenance, identified by maintenance level, based upon an equipment usage profile."<sup>10</sup> Commands which received these guides were nearly unanimous in their acclaim for them.<sup>11</sup> The only major objection was to the plan to publish the guides as training circulars. Most potential users preferred that they be published as technical manuals.<sup>12</sup>

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<sup>8</sup> Ltr, ATCL-MR, COL James H. Carroll, US Army Logistics Center, to Commandant, AADS, ATTN: ATSA-CD, March 1976, subj: Wartime Repair Parts Consumption Planning Guide Project (WARPAC), Phase II, ACN 23300.

<sup>9</sup> Ltr, ATSA-CD-MM, CPT Laurence J. Culling, AADS, to Commander, US Army Logistics Center, ATTN: ATCL-MR, 24 May 1976, subj: Wartime Repair Parts Consumption Planning Guide Project (WARPAC), Phase II, ACN 23300.

<sup>10</sup> Ltr, ATCL-MR, MG Graham to MG (P) Eugene J. D'Ambrosio, Deputy Commander, Materiel Readiness, 31 December 1975, Identical letters were sent to Generals Smith, Gregg, Gibson, Jones, Konopnicki, Fuson, and others.

<sup>11</sup> Ltr, ATLG, MG H. D. Smith, Deputy Chief of Staff for Logistics, TRADOC, to MG Graham, 15 January 1976; Ltr, DRCMA-SM, LTG D'Ambrosio to MG Graham, 2 February 1976; Ltr, AFLC-SMP, MG Lawrence M. Jones, Jr., DCS, Logistics, to MG Graham, 27 January 1976; Ltr, DALO-SMM-E, LTG Jack C. Fuson, DA DCSLOG, to MG Graham, 26 January 1976.

<sup>12</sup> MFR, ATLC-MR, Neil O. Knarr to LOGC Commander, 30 March 1976, subj: Publication of WARPAC data.

The Logistics Training Board of the Logistics Center suggested that field manuals and Army regulations be used to incorporate WARPAC data.<sup>13</sup> The DA ODCSLOG Director of Supply and Maintenance also preferred FMs.<sup>14</sup> Other recommendations were to include National Item Identification Number (NIIN) sequencing of data, add unit of issue, display parts consumption quantities for incremental end item densitites, and include a more detailed and comprehensive introduction to when, where, and how the guides will be used. These recommendations were all included in the revised versions, which were published as FMs in accordance with the decision of the Logistics Center Commander.<sup>15</sup> These revised publications were approved by DA and then distributed.

On November 1975, an IPR was given to the Command Group. The status of the WARPAC effort was reviewed and future goals were outlined. Mr. A. David Mills, Chief, Repair Parts Division, Materiel Directorate, was named as MPOC, Repair Parts Program, replacing COL Woods. A Study Advisory Group met on 3 December 1975, to review the results of Phase I and direct actions for Phase II. Fifty-one items of equipment were selected for Phase II analysis. This was subsequently reduced to 47 end items. Both TRADOC schools and DARCOM commodity commands were involved in analyzing these items. Results were scheduled to be received by the Logistics Center by 15 October 1976.

A DA ODCSLOG Joint Study Group (JSG) meeting was held on 26 May 1976, followed by a LOGC Study Advisory Group meeting the following day. These meetings clearly defined areas in which policy and doctrine changes were needed so that WARPAC could be implemented to the fullest extent. Also, an outline was established for actions to be accomplished during WARPAC Phase III. It was decided that the WARPAC effort needed to be continued until such time as the program could be established as a responsibility of an appropriate Army agency, such as the materiel developer (DARCOM). The SAG also recommended that Phase III include: (1) production of a WARPAC guide as a part of the materiel development/acquisition process for a candidate end item; (2) identification of

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<sup>13</sup> DF, ATCL-LA, Director, Logistics Training Board, to Director, Materiel, 19 January 1976, subj: Wartime Repair Part Consumption Planning Guide Project, Phase II, ACN 23300.

<sup>14</sup> MFR, ATCL-MR, Neil O, Knarr to LOGC Commander, 30 March 1976, subj: Publication of WARPAC data.

<sup>15</sup> Ibid; Fact Sheet, ATCL-MR, COL Robert W. Fisher, Director, Materiel Directorate, 2 September 1976, subj: Wartime Repair Parts Consumption Planning Guide (WARPAC).



problems and required actions associated with the incorporation of WARPAC data into existing or future equipment TMs; and (3) evaluation of the DARCOM Commodity Command Standard System's (CCSS) ability to produce WARPAC data (recommended ASLs/PLLs) in the desired format. On 28 June 1976, General Graham approved these Phase III recommendations and preliminary actions were initiated to insure compliance.<sup>16</sup>

It is not only imperative that essential repair parts be identified; they also have to be shipped quickly from the continental United States to overseas terminals. General Graham said in the summer of 1974, that the airlifting of repair parts was "the biggest single problem the Army has at the moment."<sup>17</sup> This comment was made during a meeting with the former DA DCSLOG, Lieutenant General Joseph M. Heiser, Jr. (USA Ret.) on the Airlift of Repair Parts (ALP) project. The Operations Analysis Directorate introduced a number of questions during the meeting to serve as the basis of discussion. Most of these questions dealt with the relationship between DSS and the former REAL (Routine Economic Airlift) project and with the problem of whether to declare all repair parts economically air eligible in the light of rapidly rising air cargo rates. General Heiser cautioned that a full airlift policy has its danger, and the Army would probably have to remain flexible in its use of transport modes since there was no assurance of air supremacy in future wars. During a discussion of transition to wartime, the point was made that systems for airlifting cannot be turned off without causing considerable disruptions overseas. General Heiser stated that it was the function of war reserve stocks to fill such gaps. Whether war reserve stocks would be equal to the task was not certain.<sup>18</sup>

There was also considerable discussion of the economics of airlift. General Heiser remarked that Army economic analyses always trade off reduced procurement cost against the higher cost of premium transportation. However, what is not considered is the far more significant cost avoidance which results from direct delivery systems which eliminate the losses of supplies "on the ground" overseas. This is something whose cost cannot readily be determined, but it is most important. General

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<sup>16</sup> Fact Sheet, ATCL-MR, COL Fisher, 2 September 1976, subj: Wartime Repair Parts Consumption Planning Guide (WARPAC).

<sup>17</sup> MFR, ATCL-O, COL Henry T. Jackson, Operations Analysis Director, 9 August 1974, subj: Meeting with LTG Heiser on Airlift of Repair Parts (ALP) Project.

<sup>18</sup> Ibid.

Heiser felt that they Army uses only about ten percent of the repair parts it buys because of the stock management system's inability to keep track of what is where. Lack of asset visibility was one of the major failings of the Army's conventional supply system. The major conclusion reached was that all Class IX items were probably not economically air eligible.<sup>19</sup>

Operations Analysis Directorate had the task of determining more precisely the economic feasibility of airlifting repair parts. During FY 75, a bibliography search and background study of applicable regulations, operations, and studies was conducted. In particular, the former REAL system was analyzed for its implication for the ALP study. In order to have the necessary data, an analysis of the European demand history for CY 73, was made. Also, through the Materiel Command Headquarters, arrangements were made to secure a year's worth of information on Class IX item shipments to all theaters, including CONUS. This data was then used to analyze the Class IX materiel flow pattern and to examine the operational impact of changes designed to increase its efficiency. Alternative routings for Class IX shipments within the CONUS were explored. Of importance to the question of reducing the CONUS transportation segment of order-ship-time (OST) was the work being done by the Air Force on the development of a Domestic Airlift System (DAS) to replace the LOGAIR and quick-trans systems. The introduction, in October 1974, of the Military Airlift Command (MAC) deferred air freight systems did not affect the shipment of repair parts as significantly as had been anticipated. Little cargo capacity proved to be available on the main channels. Contact was maintained, however, with various agencies concerned with the matter of MAC airlift utilization, including OASD (I&L), OASD (compt.), HQ USAF, HQ MAC, AFLC, HQDA, and AMC. As a result of correspondence between HQ USAF and the DA DCSLOG, the AFLC furnished the Logistics Center information on a study which showed the impact of OST on Air Force major item inventories. The study showed the dollar value to the Air Force of a day of OST. The Logistics Center study group, for its part, developed an estimate of the weight and value of a "Day of Repair Parts Supply" for a Corps force along similar lines.

During the summer of 1975, a number of actions took place affecting the subject of the airlift of repair parts. The Army Commander in Chief in Europe indicated that he could agree with certain proposed changes in the logistic support system for Europe, provided an airline of communications (ALOC) was established for repair parts and secondary items. The DA DCSLOG directed his Director of Supply and Maintenance to oversee actions concerning the establishment of such an ALOC. General

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<sup>19</sup>  
Ibid.

Graham visited HQ MAC on 9 September 1975, to discuss air freight rates and a dedicated airlift service for repair parts between the Army's East Coast Theater-Oriented Depot (TOD) and Europe. The MAC proposed a freight rate for channel airlift 24 percent below the current tariff rate, but this was still well above the rate needed to make the airlift economically justifiable.

An analysis was made by the Concepts and Doctrine Directorate personnel of how airlift might be used between New Cumberland Army Depot, Pennsylvania, and DSUs in Europe. The analysis concluded that the present system of delivering air cargo through Frankfurt to the drop points in the twelve existing DSU clusters in USAREUR appeared applicable for use in an ALOC, but occasional flights to airports closer to certain 7th Corps units would facilitate in-theater distribution. At the end of the first quarter of FY 76, a draft final report had been prepared for ALP.

During the second quarter, in-house coordination of the draft final report was completed and released. Copies were mailed to agencies directly concerned with the ALOC project. An ad hoc study group was formed under MODLOG 77, and under the aegis of the Logistics Center. The chairman of the group was the LOGC Scientific Advisor, Mr. Ellwood Hurford. The purpose of the study group was to study an airline of communications between the CONUS and USAREUR. The study, known as the Airline of Communications for Repair Parts (ALOC) project, was to determine what actions would be required to implement an ALOC as recommended in the ALP study. The LOGC Concepts and Doctrine Directorate had the staff responsibility.

Thus, the Logistics Center, in October 1975, assumed the lead in developing the ALOC from the CONUS to Europe for repair parts supply. However, the project was a joint effort which involved DA DCSLOG, USAREUR, DARCOM and MAC. A draft report was published on 23 April 1976, and on 4 June, the DA DCSLOG was briefed. As a result, the DA DCSLOG directed that the ALOC concept described in the report be implemented as a test beginning in January 1977. The final report was approved by General Graham on 23 August, and was forwarded to the Department of the Army on 9 September, for approval and implementation. Concurrently, the report was also distributed to all MACOMs.

The ALOC recommended by the Logistics Center involved using commercial truck transportation from New Cumberland Army Depot to Dover Air Force Base, Delaware. Channel airlift would then carry the cargo to Rhein Main or Ramstein Air Force Bases in Germany, where it would then be loaded onto military trucks for direct distribution to each consignee in Germany. It was projected that, if companion improvements were made in supply processing, the ALOC would reduce the OST by 50 percent. The goal was to reduce the OST to 20 days. A prototype test was

planned for November 1976, with a full-scale test to begin at the beginning of 1977.<sup>20</sup> Meanwhile, plans were underway within the Eighth Army to develop an ALOC from the United States to Korea.<sup>21</sup>

While the above-mentioned projects do not constitute a full inventory of the Logistics Center Repair Parts Program, they are probably the ones which will have the most profound influence on the Army logistics community. There were, however, many other studies in which the Logistics Center participated which related to repair parts. Studies were begun on maintenance standards, Army construction equipment repair parts, PLL consolidation and elimination, Retail Inventory Management Stockage Policy (RIMSTOP) policy evaluation, retail stockage policy evaluation, evaluation of provisioning techniques, and on collection, classification, cannibalization, and field expedients. One study which had relatively high visibility during 1975, was on DSU repair parts stockouts. This study, approved by General Vuley on 3 December 1975, was sent to HQ TRADOC the following month and shortly thereafter received TRADOC's approval. One of its principal conclusions was that the authorized stockage list (ASL) limitation for a maintenance battalion imposed by paragraph 7-6b, AR 710-2, may be too restrictive. Data from four CONUS divisions were used in the study and in each division the ASL size exceeded the imposed 5,000 line objective, yet demand accommodation was below regulatory standards. It was recommended that the 5,000 line ASL objective for a maintenance battalion be eliminated but the proposal was later rejected by the Department of the Army. In addition, the suggestion was made that, if DA desires to control the size of ASLs, that this be accomplished by determining the effects of various stockage policy changes followed by appropriate revisions in AR 710-2.<sup>22</sup>

The ability to return damaged equipment to the battlefield quickly and efficiently might well mean the difference between victory or defeat in the next war. Repair parts which are considered essential, high-priority, items must be identified, and they must be moved quickly to where they are needed. Finally, soldiers must be trained so that they can handle the complex equipment of today's Army--a concern of the Logistics Center's Training and Education Directorate. For all these reasons, it is likely that repair parts will continue to be of high concern to the personnel within the Logistics Center.

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<sup>20</sup> Fact Sheet, ATCL-CLT, COL D. R. Werner, Director, Concepts and Doctrine, 25 March 1977, subj: ALOC for Repair Parts to USAREUR.

<sup>21</sup> Msg, DJ-MS, USAEIGHT, Seoul, Korea, 050750Z May 76, subj: Dedicated Air Line of Communication (ALOC).

<sup>22</sup> Ltr, ATCL-CDD, BG Vuley to TRADOC Commander, ATTN: ATCD-SP, 6 January 1976, subj: DSU Repair Parts Stockouts Study.



#### IV

#### CONTAINERIZATION

One of the primary efforts of the Logistics Center during 1974-76 was to complete the Army in the Field Container System Study (AFCSS). This study analyzes and documents current and proposed uses of containers in order to identify alternative container systems to support the Army in the field. It develops concepts, doctrine, and procedures for the use of containers and identifies problems in the supply, transportation, maintenance, and control and handling of containers. All classes of supply are considered except bulk Class III and Class X. The study was submitted to Department of the Army Headquarters as a final TRADOC report on 12 December 1974. Concurrently, copies were furnished to approximately seventy commands, agencies, and activities in the United States and overseas. The study was approved by the Department of the Army on 8 March 1976. The LOGC Deputy Commanding General, in response to a directive from TRADOC headquarters, signed a comprehensive report on 4 June 1976, which summarized both the status and accomplishments of the AFCSS. This report was sent to TRADOC headquarters.<sup>1</sup>

The AFCSS provides a flexible system for support of the Army in the field in a wide range of operational environments. It utilizes three basic distribution patterns, which may be modified or combined as appropriate, to satisfy container distribution requirements in any theater of operations. Those features found to be most critical to the container distribution system in an oversea theater are transportation facilities (ports, terminals, and transportation networks) and supply facilities (container handling and storage areas). The AFCSS can accommodate both military-owned and commercial containers and supporting equipment, providing for the throughput of the containers to the lowest practical echelon. The system, it was concluded, requires closer coordination of supply and transportation functions at all echelons. Consequently, appropriate changes must be made in field manuals and other doctrinal literature which provide guidance for the operations of supply and transportation units. Forty field manuals affected by containerization have been identified which are within the proponentry of the Logistics Center and associated schools. A schedule for revision of these field manuals--to incorporate containerization doctrine--was developed during FY 76.

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<sup>1</sup>MFR, ATCL-CLT, Donald W. Osgood, Major Program Objective Coordinator for Containerization, to BG Ernest A. Vuley, Jr., 16 September 1976, subject: Major Program Objective (Containerization).

The AFCSS also has a significant impact on organization. Four transportation and eighteen supply TOEs require revision to incorporate container-related equipment so that necessary container handling and distribution capabilities are provided. By FY 76, the transportation TOEs had been revised; however, the supply TOE still had not been changed. Although current DA policy generally precludes the addition of equipment which is not type classified (e.g., container-related material handling equipment), an exception was made for the transportation TOE. During FY 76, the Logistics Center was involved in action to obtain authority to add the needed material handling equipment to supply unit TOEs. The particular material handling equipment needed were the 50,000-pound container handler (front loader), the 4,000-pound rough terrain forklift, and the mobile loading ramp. Basis of issue plans (BOIP) for container-related equipment items were developed; however, during FY 76, a number of these items required further review and revision. At the close of the period, action was underway to revise the BOIP for the twenty-foot refrigerated container and the 10,000-pound rough terrain forklift.<sup>2</sup>

By the end of FY 76, the required operational capability (ROC) documents for most container-related material items, which had been recommended by the AFCSS and associated studies, had been approved by the Department of the Army Headquarters. For material handling equipment, seven ROCs had been approved out of eight recommended; for transportation equipment, four out of five; containers, one out of two; and for marine equipment, one out of three. ROCs for the other items were being processed at the close of the fiscal year. For a significant number of items, the acquisition process was well-advanced. Generally, container-related equipment was awarded a high degree of priority in the TRADOC priorities program.

In response to tasking from the major program objective coordinator, Mr. D. W. Osgood, in October 1975, the Training and Education Directorate conducted a survey of Logistics Center associated schools to determine the type of container-related training being conducted within the schools. By early 1976, all Logistics Center associated schools were conducting a considerable range of container-related subjects within their programs of instruction. The most detailed instruction was being conducted within the Transportation and Quartermaster Schools.

Two of the most important follow-on container studies were of the Intermediate-Size Container (INTERCON) and of the Containerized Shipment and Storage of Ammunition (COSSA). The INTERCON study directive was

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<sup>2</sup>Ibid.

approved by TRADOC on 25 November 1974, and the initial SAG was convened a day later. On 3 January 1975, a study plan was submitted. The major purpose of INTERCON was to assess the US Army's requirements for standard intermediate-size (less than twenty feet in length) cargo containers to replace the CONEX container. In keeping with general commercial trends, the Army had settled on large container sizes ranging from 8 x 8 x 20 feet to 8 x 8 x 40 feet for shipment of the majority of its containerized cargo. However, in recommending a family of military-owned containers, the AFCSS proposed that a TRICON container (8 x 8 x 6-2/3 feet) be procured for use by the Army as a replacement for the CONEX container. Three TRICONS could be coupled together to form a standard unit of 8 x 8 x 20 feet. It was envisioned that the TRICON would be used in unit deployments, for forward area supply distribution, and for specialized shipments where the use of a larger container would not be as practicable in certain environments and levels of combat intensity.<sup>3</sup>

Input for the INTERCON study was obtained from the Quartermaster and Transportation Schools as well as the major commands. The initial INTERCON draft was distributed to the field on 26 August 1975. After further coordination and review, the study was submitted as a final draft to TRADOC headquarters in January 1976, and was approved by the headquarters on 16 April 1976. In June, it was forwarded to the Department of the Army and distributed worldwide.<sup>4</sup>

The principal finding of the INTERCON study was that an intermediate-size container, such as TRICON or QUADCON, was not needed to succeed the CONEX container. The high cost and limited air transportation available (C-5A only) for the supporting 15,000-pound capacity rough terrain forklift for the TRICON raised the question as to the desirability of the TRICON and whether, in fact, the Army needed a standard intermediate container as determined by criteria established by the American National Standards Institute (ANSI) and the International Organization of Standards (ISO). While such a container was appealing in inter-theater surface movement, the determination of need had to consider inter-modality on a total system basis, packaging alternatives, and cost effectiveness.<sup>5</sup>

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<sup>3</sup> Ltr, ATCL-CC, COL Herbert T. Casey, Jr., Director, Concepts and Doctrine Directorate, to Commanding General, Air Force Logistics Command, Wright-Paterson Air Force Base, 27 January 1975, subject: Combat Development Study: Intermediate-Size Cargo Containers and Associated MHE (INTERCON).

<sup>4</sup> MFR, ATCL-CLT, Osgood to Vuley, 16 September 1976.

<sup>5</sup> Ltr, ATCL-CC, Casey to Commanding General, Air Force Logistics Command, 27 January 1975.

Consequently, the costly developmental effort on the TRICON container was terminated. Surface deployment planning would utilize, it was decided, Army milvans and equivalent commercial containers. Air Force deployment planning would be based on using Air Force 463L pallets, 40- x 48-inch warehouse pallets, container inserts, and the cargo compartment of the unit vehicles. The study did recommend, however, the development of an improved family of container inserts modular to ANSI/ISO containers.

The COSSA study, initiated in June 1974, was DA directed (DCSLOG). The Deputy for Supply, Maintenance, and Transportation, OASA (I&L) was the study sponsor. The main purpose of this study was to determine the logistic doctrine and operational procedures required to use government-owned and commercial containers for direct delivery and enroute storage of conventional ammunition and missiles. Implementation of the COSSA system will allow the Army to ship containerized ammunition routinely to the direct support ammunition supply points of the corps support command.

The first meeting of the COSSA SAG, held on 12 November 1974, directed the study effort to consider the ammunition user (artillery, armor, infantry) requirements in order to determine the optimum support concepts. The 8- x 8- x 20-foot container size constraint was also removed in order to permit greater flexibility in formulating the overall concept. Thereafter, heavy reliance was placed on OPLAN 4102 and TRADOC Standard Scenarios ME-II and Europe. An initial coordination draft of the COSSA study was forwarded to SAG participants and major commands for review on 29 October 1975. Since many comments from all commands were received late, the originally scheduled SAG meeting for December 1975, was postponed. A coordination appendix, which listed the comments and LOGC responses, was forwarded to each SAG member for his review and concurrence on 12 March 1976, and a SAG meeting was finally held at the Logistics Center on 30-31 March. The SAG members concluded that several areas of the study required further expansion before the draft could be forwarded to TRADOC headquarters. In the following months, these necessary revisions were made, and the SAG members approved the revised version in September.

To provide flexibility for field operations, the COSSA study reflects three alternatives in the handling and storage of containers at the corps storage area (CSA) and ammunition supply points (ASP). The alternatives are: (1) retention (storing) on chassis; (2) grounding containers; and (3) stripping containers on arrival. The study indicates that all three alternatives may be viable under particular operational environments, but the norm would be to ground containers at



the CSA and to strip containers at the ASP. The establishment of a "norm" is necessary in order to justify equipment and organization.<sup>6</sup>

The change from a breakbulk to a container fleet necessitates numerous significant alterations in transportation, terminal, and material handling operations. One of the efforts designed to answer questions about the impact of containerization on terminal operations and Logistics-Over-the-Shore (LOTS) was CHITO, Container Handling in Terminal Operations. The CHITO project was a result of recommendations contained in both the AFCSS and TRANS-HYDRO studies. As a result of initiatives by the Logistics Center and TRADOC Headquarters, in the late summer of 1974, the Army Materiel Command (AMC) agreed to provide to Fort Eustis, where the project was to be conducted, the minimum container handling equipment needed, with the exception of the cranes and sideloaders which would be obtained when funds were available and approved. Fort Eustis requested that the currently available equipment be transferred to their installation and that TRADOC provide \$37,100 for the balance of FY 75, for transportation, maintenance, support, and operator familiarization. Additionally, AMC agreed to make provisions for quick reaction maintenance support needed during training and evaluation. FORSCOM designated the 119th Terminal Service Company at Fort Eustis as the operating (test) unit for CHITO.

Meanwhile, the Commandant of the US Army Transportation School at Fort Eustis was tasked by the TRADOC headquarters to develop a detailed plan for execution of the CHITO project. Henry G. Alley, Jr., Acting Director of the Materiel Directorate at the LOGC, wrote to the Commandant:

The LOGC has an intense interest in having a container handling capability developed, in the shortest possible time frame, for training and evaluation purposes at Fort Eustis. This will allow the policies, procedures, equipment, and training to be refined in an operational environment. We fully support your efforts and stand ready to provide assistance where possible.<sup>7</sup>

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<sup>6</sup>MFR, ATCL-CLT, LTC Delma G. George, Chief of the Logistical Functions Division, Concepts and Doctrine Directorate, to COL Robert H. Kies, Acting Director, Concepts and Doctrine, 30 July 1976, subject: Containerized Shipment and Storage of Ammunition (COSSA) Study.

<sup>7</sup>Ltr, ATCL-MR, Henry Alley to Commandant, US Army Transportation School, 4 October 1974, subject: Container Handling in Terminal Operations.

The plan was submitted to TRADOC headquarters on 8 October 1974. It included planning for utilization of equipment, unit training, evaluation, maintenance, and projected problems. The G-3, Fort Eustis, assumed responsibility for implementing the CHITO project, assisted by the Combat Development Element for the Transportation School.

Funds were made available to buy two 250-ton and two 140-ton cranes in early 1975. The Army Troop Support Command prepared the procurement documents, and the cranes were delivered towards the end of 1975. Also, in early 1975, the prototype equipment was transferred from MERDC to Fort Eustis. This equipment, to be used for training, included rough terrain forklifts, a side loading and a front loading container handler, a top lift device, and a mobile ramp. Five 67,200 pound container handlers (sideloaders) were delivered to the CHITO project during 1976. Six 50,000-pound Clark container handlers (frontloaders), weighing approximately 154,000 pounds and costing \$312,000.00 each, were scheduled for delivery in the early part of 1977. Five are to be used in the CHITO project and one for MERADCOM testing.<sup>8</sup>

During 1976, personnel at TECOM, Aberdeen Proving Ground, tested twenty-two 1/2 ton semitrailers (tactical) developed for transport of 20-foot containers or of breakbulk cargo. The test, revealed a number of serious problems, most serious of which was the tendency of the trailer to turn over when carrying a 20-foot container, apparently with little warning. It was decided that the prototype would have to be returned to have 4 feet added to the frame to increase stability and to correct other, more minor deficiencies.<sup>9</sup>

The CHITO test dovetailed with, and was largely incorporated into, another series of tests called LOTS or Logistics-Over-the-Shore. LOTS operations with containers were known in 1970 and 1972 as OSDOC (Off-Shore Discharge of Containerships) I and II, respectively. These tests involved evaluation of equipment, including container ships, and procedures used in over-the-shore operations. On 23 July 1974, the Director of Defense Research and Engineering awarded a contract to Operations Research, Inc. (ORI) to develop a study which would define and design the joint service tests to be conducted. This study was briefed to the Director in March 1975. Meanwhile, the DOD Project Manager for Container Distribution Systems (AMC-PM-CS), working with a joint OSDOC working group, developed concept papers designed to guide a coordinated joint service

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<sup>8</sup> MFR, ATCL-CLT, Osgood to Vuley, 16 September 1976.

<sup>9</sup> Ibid.

effort to achieve needed containership discharge capabilities. The three concept papers addressed: (1) the containership discharge subsystem; (2) the lighterage subsystem; and (3) the shoreside subsystem. Representatives of the LOGC, Transportation School, and the Quartermaster School participated in this developmental action along with representatives from the Navy and Marine Corps. By the end of FY 75, two of the three papers had been accepted by the Services.

During 19-23 April 1976, the conventional breakbulk ship test was conducted in the Norfolk/Fort Eustis/Fort Story area, the first of the Joint LOTS preliminary tests. Major items of LOTS/CHITO equipment were loaded and offloaded. These included the 250-ton crane, an LCM-8, and a 3 x 15-foot Navy causeway section. This test proved the feasibility of deploying major items of LOTS container-related equipment aboard a conventional breakbulk ship. During 23-26 August 1976, the LASH Ship Test was conducted in the same area. Major LOTS items which were loaded included both the 250- and 140-ton cranes, an LCM-8, a 67,200-pound sideloader, and a 4 x 15-foot causeway section.

Prior to the main LOTS test, scheduled for August-September 1977, which will involve the entire LOTS system, two additional ship tests are scheduled. In November 1976, the Heavylift Breakbulk Test will be conducted; and, in early 1977, the Seabee Ship was scheduled to be tested. Both of these tests will continue the assessment of the Army's capability to deploy its LOTS and container handling equipment aboard the civilian merchant fleet. In addition to these tests, the LACV-30, which will play a major role in the movement of containers in a LOTS environment, was scheduled for testing in the fall of 1976.<sup>10</sup>

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<sup>10</sup>  
Ibid.

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THE ARMY'S "BIG FIVE"

Utility Tactical Transport Aircraft System (UTTAS). This system is destined to be the Army's first true squad carrying helicopter. It will provide increased troop lift capability and strategic mobility, with a reduction in mission costs, maintenance, and logistics support. Designed "with the combat soldier in mind," the UTTAS will be capable of carrying a three-man crew and a fully equipped eleven-man assault squad in virtually any climate in which the Army is likely to operate and at any altitude; the UTTAS is able to fly nap-of-the-earth (NOE).

The UTTAS is relatively invulnerable to small arms fire through the use of armor and non-essential equipment used as buffers, and its rotors are designed to survive impacts with branches of trees. The composite rotor blades, easily replaced in the field without special tools or testing, can continue to operate without splintering after absorbing hits from high explosive shells up to 23mm. Sufficient tail fin area exists to allow continued flight even if the tail rotor is completely shot away. Redundant electrical and other subsystems permit essential functions to continue in spite of battle damage. The seat supports are engineered to collapse upon impact, which will enhance both occupant and aircraft survivability.<sup>1</sup>

The T700 engine represents a "giant technological step forward." It is far simpler in its construction and easier to maintain, and delivers more power at half the weight, and with 20 percent less fuel, than the current Huey engine. The twin T700 engines are designed for easy maintenance. In spite of its design sophistication, the engine can be maintained in the field with 10 simple tools from the mechanic's basic tool kit.<sup>2</sup>

The UTTAS is designed to be air-transportable. Loading demonstrations of mock-ups of both contractor's (Boeing Vertol and Sikorsky) prototypes, in USAF C-130 and C-141 aircraft, were completed during FY 75, with Air

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<sup>1</sup>AVSCOM, Annual Report of Major Activities, FY 75, p. 172; "UTTAS Acceptance--A Real Beginning," Army Aviation, XXIV, 4 (Apr-May 1976), 19, 26; AVSCOM, Annual Report of Major Activities, FY 75, pp 172-173, which cites Senate Armed Services Committee. Hearings 76 Budget, 25, 27 Feb; 4, 5 Mar 75, Pt 4, p. 1770.

<sup>2</sup>"UTTAS Acceptance -- A Real Beginning," Army Aviation, XXIV, 4 (Apr-May 1976), 19, 26; AVSCOM, Annual Report of Major Activities, FY 75, pp 172-173 which cites Senate Armed Services Committee, Hearings 76 Budget, 25, 27 Feb; 4, 5 Mar 75, Pt 4, p. 1770.



Force approval for air transporting of the UTTAS subsequently granted. Loading demonstrations on a C-5A indicated that six UTTASs can be carried without disassembly.<sup>3</sup>

In the development of the UTTAS, the Army laid down some tough performance specifications and requirements, which "stretched the state-of-the-art in all directions." These include: (1) ability to carry a fully equipped eleven-man squad, plus three-man crew (pilot/commander, co-pilot/gunner, and gunner/crew chief); (2) an ample cabin, with wide sliding doors that have to remain safely open at up to 145 knots airspeed; (3) must be loaded into C-130 or C-141 aircraft with a minimum of preparation, and six UTTAS must fit in a C-5A; and (4) required to climb to 17,500 ft, land on ground sloping 17 degrees; and lift a sling load of 7,000 lbs.<sup>4</sup>

In summing up the UTTAS design and performance capabilities, the Honorable Edward A. Miller, Assistant Secretary of the Army (R&D), speaking at the UTTAS Acceptance Ceremony, Ft Benning, GA, 20 March 1976, stated that "inherent in its advanced design are (more) significantly improved performance reliability and survivability capabilities than ever before embodied in a single" Army helicopter. "From crashworthy seats to crash resistant fuel cells and unprecedented agility, this aircraft will survive the rigors of battle far better than any of its predecessors in the Army fleet."<sup>5</sup>

The UTTAS program commenced with ASARC/DSARC I and II, 13 May 1971, which reviewed the Army proposal to transition the UTTAS program from concept formulation to the validation phase. This was followed, on 22 June 1971, by OSD approval of the UTTAS Decision Coordinating Paper (formerly known as Development Concept Paper) No 13 for development of the UTTAS helicopter.

Airframe RFPs were issued on 5 January 1972. UTTAS air vehicle contracts to Sikorsky (DAAJ01-73-C-0006(P40)) and Boeing Vertrol (DAAJ01-73-C-0007(P40)), requiring one Static Test Article (STA), one Ground Test Vehicle (GTV), and three flying prototypes from each contractor, were awarded on 30 August 1972. Sikorsky's contract was for \$61M; Boeing Vertrol's was for \$91M.

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<sup>3</sup>AVSCOM, Annual Report of Major Activities, FY 75, p. 172.

<sup>4</sup>Mark Lambert, "UTTAS: The Helicopter of the 1980s?", US Naval Institute Proceedings, (Oct 1976) 123-130.

<sup>5</sup>"UTTAS Acceptance--A Real Beginning," Army Aviation, XXIV, 4 (Apr-May 1976), 19, 26.

The first Sikorsky prototype made its initial flight on 17 October 1974, six weeks ahead of contract schedule. The second prototype followed on 21 January 1975, and the third on 28 February 1975. The first Boeing Vertol prototype made its initial flight on 29 November 1974, also ahead of schedule. The second prototype followed on 19 February 1975, with the third on 28 May 1975.<sup>6</sup> On 2 May 1975, both contractors received a Full Envelope Flight Release which cleared the way for the conduct of all the surveys and demonstrations required by the Airworthiness Qualification Specification.

As a result of the Request for Quotation, submitted to industry on 30 July 1971, responses to produce the engine for the UTTAS were received from General Electric, Pratt & Whitney, and Lycoming. The selection process was completed with the announcement, in December 1971, of GE's T700-GE-700 Engine as the winner. Negotiations were completed, and a contract (DAAJ01-72-C-0381), for Development and Air Vehicle Support of the GE T700-GE-700 Engine, was awarded to General Electric on 6 March 1972.

The T700 Engine was also selected for the Advanced Attack Helicopter (AAH), with the engine and support requirements for the competing AAH airframe contractors being added to the GE contract on 23 July 1973.

After Mock-Up and Critical Design Reviews, the First Engine to Test (FETT) started operation in February 1973. A Design-to-Cost objective for the T700 Engine was negotiated and incorporated into the contract on 29 November 1973.<sup>7</sup>

On 6 March 1975, GE was awarded an engine maturity contract (DAAJ01-75-C-0360), for \$37,682,300, to continue development of the T700 Engine through June 1978. On 11 June 1975, Contract DAAJ01-75-C-0844 (P6D) was awarded to GE for BLISK Manufacturing Development to support the T700 Engine, and on 26 September 1975, a cost-plus-incentive-fee (CPIF) contract (DAAJ01-76-C-0068), for Engine Production Engineering and Planning (PEP) was awarded to GE.<sup>8</sup>

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<sup>6</sup> AVSCOM, Annual Report of Major Activities, FY 75, pp 173-174; UTTAS PMO, Review and Analysis, 4th Qtr FY 76, 20 Aug 76, p. ii; Lambert, Mark, "UTTAS: The Helicopter of the 1980s?", US Naval Institute Proceedings, (Oct 1976), pp 128-130.

<sup>7</sup> AVSCOM, Annual Report of Major Activities, FY 74, p. 219; UTTAS PMO, Review and Analysis, 4th Qtr FY 76, 20 Aug 76, p. ii.

<sup>8</sup> AVSCOM, Annual Report of Major Activities, FY 75, p. 177; UTTAS PMO, Review and Analysis, 4th Qtr FY 76, 20 Aug 76, p. ii.

During the year's testing program, both contractor's prototypes were involved in accidents. A Boeing YUH-61A crashed, 19 November 1975, during flight test activities, near the Grumman test facility at Peconic River, NY, after the tail rotor drive shaft failed during autorotational tests. Although the helicopter hit oak trees up to 15 inches in diameter, all key fuselage components were found to be still in alignment. A main landing gear mount broke, and the two T700 Engines sustained minor damage. The YUH-61A resumed flying, 19 February 1976, after being repaired at Boeing's Philadelphia facility.<sup>9</sup>

On 9 August 1976, Sikorsky YUH-60A test prototype 73-21650, during OTII testing at Fort Campbell, KY, made a emergency forced landing in woods during night maneuvers. Primary cause of the incident was the in-flight loss of approximately 4 1/2 sq ft of lifting surface from one main rotor blade. The 14 passengers and crew were unhurt. Army maintenance personnel replaced the main and tail rotor blades damaged by tree strikes during the landing, and the aircraft was flown out under its own power. After personally visiting the crash site, MG Jerry B. Lauer, UTTAS PM, stated that "it was an excellent demonstration of the ruggedness of the aircraft to have it flown back to the test site following the replacement of only the main and tail rotor blades. This speaks extremely well of its structural integrity."<sup>10</sup>

To facilitate the acquisition of data to be used for an analysis of logistics support, computer programs were installed at each contractor's plant for the automation of the Logistics Support Analysis effort. The automation was produced by the US Army Maintenance Management Center in accordance with the MEA Data System, TM 38-703-3. The MEA data was transcribed by the contractors via computer tapes to the US Army Aviation System Command's (AVSCOM) computer facility for hard copy printout.

During FY 1976, the Logistics Center worked with the United States Army Infantry Center (USAIC) to develop RAM requirements and rationale for the UTTAS system. The Infantry Center established that the basic mission required that the operationally available aircraft from a company of 15 UTTAS helicopters must (in a single lift) transport a minimum of 120 infantry assault troops (11 troops maximum per helicopter)

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<sup>9</sup>"Boeing UTTAS prototype to fly after repairs," Aviation Week & Space Technology, 15 Dec 73, p. 43; Aviation Week & Space Technology, Vol 104, No 9, 1 Mar 76.

<sup>10</sup>Aviation Week & Space Technology, CV, 7 (23 Aug 1976; Ltr, DRCPM-UA-L, to Division President, Sikorsky Aircraft Division, subj: YUH-60A Forced Landing.

from base to a designated landing zone and then return to base. The basic mission for establishing RAM requirements was 0.8 flying hours duration and required an 85 percent probability of success.

The Logistics Center determined that an operational availability of 75 percent (providing an average of 11 aircraft to start the mission) and an aircraft mission Mean Time Between Failures (MTBF) of 54 hours satisfied the mission requirements established by the Infantry Center. If the operational availability were increased to 80 percent (providing an average of 12 aircraft to start the mission), an aircraft mission MTBF of 13.5 hours would satisfy the mission requirements; however, one helicopter would be lost in most of the missions.<sup>11</sup>

The Logistics Center, working in conjunction with DARCOM and the Infantry School, also developed an established RAM data for OT/DT II and for the mature aircraft. The Coordinated Test Program (CTP-11) was completed in October 1975. At the request of the Infantry School, the LOGC also developed the aircraft replacement policy required for UTTAS. It was determined that aircraft could be replaced on a one for one basis and on the same day.<sup>12</sup>

A three-week pilot training program for the two UTTAS prototypes was completed at Fort Rucker, Alabama, on 19 March 1976. Fifteen DA military and civilian pilots received training. With the completion of this flight test program, Sikorsky and Boeing Vertol delivered their UTTAS prototypes (three from each contractor) to the Army for Government Competitive Testing (GCT) at acceptance ceremonies, held at Fort Benning, GA, 20 March 1976. Following the ceremonies, two each of the UTTAS prototypes were delivered to Fort Rucker, AL, and one to Edwards AFB, CA, 20 March 1976, via Air Force C-141s.<sup>13</sup>

GCT began on 24 March 1976, with simultaneous DTII testing at Fort Rucker and Edwards AFB. Upon delivery of the prototypes to Fort Rucker, a group of Army pilots received transition training on the UTTAS. Qualification consists of one week of ground school and ten hours of flight training, and was completed on 13 April 1976. DTII was completed

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<sup>11</sup> Ltr, ATCL-MA, Col Van Auken to Commander, USAIC, n. d., subj: UTTAS Minimum Acceptable Values (MAV) for RAM Parameters in the MN.

<sup>12</sup> Ltr, ATCL-MA, COL Van Auken to Commandant, USAIS, 12 Mar 76, subj: Aircraft Replacement Policy; Msg, ATSH-CD-UG, Commandant, USAIS, to Commander, USALOGC, 252038Z Feb 76, subj: Aircraft Replacement Policy.

<sup>13</sup> UTTAS PMO, Review and Analysis, 4th Qtr FY 76, 20 Aug 76, p. D-9; Plane Talk, Vol 7, No 4, 27 Feb 76; Army Times, No 34, 22 Mar 76, p. 26; UTTAS PMO, Review and Analysis, FY 7T, Dec 76, pp H3-H4.



at Fort Rucker on 15 June 1976, and was completed at Edwards AFB on 18 September 1976.<sup>14</sup>

Upon the completion of DTII at Fort Rucker, the UTTAS prototypes were sent to Fort Campbell, KY, for Operational Testing (OT) II, which was conducted by OTEA, and was completed on 2 September 1976. Following completion of DTII at Edwards AFB, the UTTAS prototypes underwent preparation for the Alaskan Artificial Icing Test, 19-30 September 1976. This test will be conducted, during the October/November 1976 time frame, at Fort Wainwright, AK.

On 1 September 1976, both Ground Test Vehicles (GTV) were airlifted from contractor's facilities to Eglin A.F.B., FL, for environmental testing in the Climatic Hanger. Testing is currently in progress, and is scheduled for completion in late December 1976. With the completion of the Climatic Hanger Test, the GCT portion of the UTTAS Program will be finished.<sup>15</sup>

The Source Selection Evaluation Board (SSEB) was convened, in May 1976, at St Louis Area Support Center (SLASC), Granite City, IL, for the purpose of evaluating competitive fly-off test data and contractor's proposals for UTTAS production quantities. An award to the contractor most responsive to Government objectives, schedule, and performance will result from the assessment and recommendation of the SSEB in December 1976.<sup>16</sup>

Advanced Attack Helicopter (AAH). The role of the Advanced Attack Helicopter will be to provide close fire support to ground forces against enemy armor and point targets during the day and night and in adverse weather. The helicopter will be an integral part of the combined arms team. Presently planned to have the HELLFIRE missile system, 2.75 rockets, and a 30-mm cannon, the AAH will be able to sustain hits anywhere from 12.7-mm shells by the use of advanced armor, ballistic fragmentation barriers between the pilot and gunner, and by redundant flight controls throughout, including the tail rotor.

In June 1973, The Deputy Secretary of Defense authorized the Army to initiate a research and development program divided into two phases.

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<sup>14</sup>UTTAS PMO, Review and Analysis, 4th Qtr FY 76, 20 Aug 76, p. D-9; Army Times, 34th Yr, No 36, 5 Apr 76, p. 26; Sikorsky UTTAS Update, 25 Mar 76; UTTAS PMO, Review and Analysis, FY 7T, Dec 76, pp H3-H4.

<sup>15</sup>UTTAS PMO, Review and Analysis, FY 7T, Dec 76, pp H3-H4; UTTAS PMO, Annual Historical Summary, FY 76, pp 1-2.

<sup>16</sup>UTTAS PMO, Annual Historical Summary, FY 76, p. 2.

Phase I was to be the competition to develop an AAH airframe. Phase II was to focus on the development of the subsystems (missile, cannon, rocket, target acquisition and night vision) and their integration into the winning helicopter. During July 1973, Bell Helicopter Company and Hughes Helicopters were awarded contracts to design and fabricate a static ground test vehicle and two flying prototypes to be evaluated during the competition. The Bell candidate, a two-bladed tricycle-gear aircraft with the pilot located in the front, was designated the YAH-63. The Hughes Helicopter, a four-bladed, three point-gear system with the pilot in the rear seat, was called the YAH-64. Both aircraft used twin T-700 General Electric turbine engines.<sup>17</sup> Contractor flight testing of the prototypes began in September 1975. Nine months later the aircraft were delivered to the Army for a government competitive test (DT I) at Edwards Air Force Base, California. There military test pilots and operational pilots from user commands participated in ninety hours of flight testing of each aircraft prototype. An accident just prior to the start of testing seriously damaged one of the Bell prototypes; however, testing continued with the two Hughes helicopters and one Bell aircraft. Meanwhile Bell rebuilt the damaged helicopter.<sup>18</sup>

The first Operational Test (OT I) took place during the last two weeks in September 1976. This test utilized the AH-1S (Cobra-TOW) as the baseline aircraft. This aircraft was matched against the contractors' prototypes hour per hour. Neither DT nor OT addressed anything other than the airframe. The separate development of the airframe on one hand and the night vision and missile subsystems on the other caused concern for personnel with the Logistics Center's Materiel Directorate. In the words of Colonel Van Auken, Director of Materiel, such parallel development "increases the risk of obtaining a less than desirable total system."<sup>19</sup>

Active Logistics Center involvement in the development of the Advanced Attack Helicopter had begun in earnest in August 1975, when the Army Concepts Analysis Agency asked TRADOC for assistance in developing the

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<sup>17</sup> "The AAH Program," Army Aviation, XXV, 8&9 (Aug-Sep 1977), 11-12.

<sup>18</sup> Ibid., p. 12; Fact Sheet, ATCL-MA, COL Van Auken, 30 July 1976, subj: Advanced Attack Helicopter.

<sup>19</sup> Fact Sheet, ATCL-MA, COL Van Auken, 30 July 1976, subj: Advanced Attack Helicopter.

cost and operational effectiveness analysis (COEA).<sup>20</sup> At a meeting held at CAA in the middle of September, a clarification of what exactly was required was obtained. Specifically, the Logistics Center was asked to develop planning data for the intertheater airlift of the AAH and to identify the type, quantity, and operational impact of ground support equipment required for AAH air transportability.<sup>21</sup> After obtaining necessary information from various Army organizations,<sup>22</sup> the Logistics Center<sup>23</sup> wrote its response to the Concepts Analysis Agency on 30 October 1975.

The first Defense System Acquisition Review Council (DSARC I) for the AAH was held in January 1976. In May the Materiel Need document was reviewed at Fort Rucker. At that time it was decided that the TOW weapon subsystem should be deleted in favor of the HELLFIRE modular missile system.

PATRIOT (SAM-D) Missile System. At the invitation of MG C. Means,<sup>24</sup> Project Manager of the SAM-D Project Office, Redstone Arsenal, Alabama, representatives from the Logistics Center visited the Project Office on 24-25 November 1975. The focal point of the discussion was the logistics support structure for SAM-D. A basic question was whether or not an identifiable direct support maintenance function was in fact required and, if so, by what organization, at what level, and in accordance with what doctrine or concept. Project personnel stated that the Materiel

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<sup>20</sup>Ltr, MOCA-SAF, COL William N. Eichorn, II, CAA Chief of Staff, to Commander, TRADOC, 13 August 1975, subj: Advanced Attack Helicopter Cost and Operational Effectiveness Analysis (AAH COEA).

<sup>21</sup>DF, ATCL-MA, CW3 Lawrence M. Jantz to Director, Materiel, 17 September 1975, subj: Trip Report.

<sup>22</sup>Ltr, AMCPM-AAH-TM-A, LTC Robert D. Hubbard to Commander, USALOGC, 10 October 1975, subj: AAH Air Transportability Data; Ltr, ATSP-CTD-MS, Major Joseph F. Peters, USATSCH, to Commander, USALOGC, 10 October 1975, subj: Ground Support Equipment (CSE) Required for AAH Transportability; Ltr, MIT-TRP, COL Joseph G. Farrell, Deputy Director, Military Traffic Management Command, to Commander, LOGC, 10 October 1975, subj: AAH Air Transportability Data.

<sup>23</sup>Ltr, ATCL-MA, COL Van Auken to Commander, CAA, 30 October 1975, subj: Advanced Attack Helicopter Cost and Operational Effectiveness Analysis (AAH COEA).

<sup>24</sup>MFR, ATCL-M, COL Van Auken, 21 November 1975, subj: Commander's Guidance and Logistic Support for SAM-D.

Need (MN) document specified no direct support for SAM-D; however, pursuant investigation revealed that the MN only implies this. It was pointed out in the document that the inherent design features of the SAM-D would result in such high reliability that no direct support would be needed. Nevertheless, it became clear to the Logistics Center representatives, CW3 Hennington and Mr. Alan Platt, that some sort of intermediate level of maintenance, between Organizational and General Support, would be required. As a result of this meeting, various actions commenced within the Logistics Center. The Organization and Training and Education Directorates reviewed the Draft SAM-D Section VI Logistics Support Plan. Concepts and Doctrine Directorate conducted an indepth analysis of the SAM-D proposed GS Contact Team Maintenance in order to determine its viability, particularly under the COGS concept. Finally, the Materiel Directorate assumed the responsibility for preparing a coordinated response to General Means for General Graham's signature and for tasking the LOGC associated schools for necessary data.<sup>25</sup>

Among some of the interim suggestions received from the directorates and associated schools were (1) examining the ATSS for PATRIOT General Support, (2) using the Maintenance Data System (automated storage and display of maintenance and operation information) instead of technical manuals, (3) using a mobile missile recertification facility, and (4) using more reliable power source equipment. A final coordinated response was sent over the LOGC Chief of Staff's signature to the SAM-D Project Manager on 21 April 1976. In this letter, Colonel Carroll noted, "There is no firm evidence that the maintenance concept specified in the Materiel Need document and reflected in Section VI of the Development Plan is not adequate to support SAM-D when fielded. However, the concept of not having a direct support maintenance capability for SAM-D peculiar equipment has caused concern among staff members in the USALOGC and USAMMC."<sup>26</sup> The Chief of Staff advised that the Logistics Center was initiating an examination of the existing support concept with the goal of suggesting alternatives. The study would take 120 days to complete. It was anticipated that this examination would "result in a modest change to the maintenance concept in that DS contact teams would be required."<sup>27</sup> However,

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<sup>25</sup>DF, ATCL-MM, Mr. Alan Platt, and CW3 Albert H. Hennington, to Director, Materiel, 1 December 1975, subj: Trip Report--SAM-D.

<sup>26</sup>Ltr, ATCL-MM, COL Carroll to Project Manager, SAM-D Missile System, 21 April 1976, subj: Draft Development Plan Section VI Plan for Logistic Support SAM-D Missile System.

<sup>27</sup>Ibid.



no change in type or complexity of test equipment was envisioned, nor was it expected to result in a requirement for a full scale DS capability.<sup>28</sup> Towards the end of FY 76, a Signal School nonconcurrence with the Development Plan was resolved, and "PATRIOT" was adopted as the official name for the SAM-D system.

Mechanized Infantry Combat Vehicle (MICV). This vehicle was conceived as a companion to the main battle tank in the combined arms team. It was to be an armored, diesel-powered, full-tracked vehicle, which would accommodate an 11-man mechanized infantry squad. The primary armament was an XM-236, dual feed, 20mm automatic cannon, while the secondary armament would be the XM-238 7.62mm machine gun, mounted coaxially with the main gun. The MICV was developed to enhance the combat capability and effectiveness of the mechanized infantry squad. It would offer numerous advantages over the earlier M13A1 Armored Personnel Carrier. Improvements were expected in the areas of mobility, crew protection, firepower, compatibility with the main battle tank, survivability, night operations, reliability/durability, maintainability, and crew comfort.

A Qualitative Materiel Requirement (QMR) for the MICV was approved by the Department of the Army in October 1968. In 1972, the QMR was replaced by the MICV Materiel Need (MN) document. The MN provided for a lightly armored vehicle which would offer protected cross-country mobility and vehicular mounted firepower to support the mechanized infantry squad in mounted and dismounted combat. The vehicle would serve as the replacement for the M113 series of Armored Personnel Carriers in the combat role, be compatible with the mobility of the main battle tank, and possess inherent swimming capability.

The Logistics Center became actively involved in the development of the MICV in the spring of 1975, when the Materiel Directorate offered to prepare for the Infantry School the necessary logistical concepts for the MICV OT II. The resulting document, the first such written within the Logistics Center, principally addressed supply, maintenance, and transportation requirements. "Essentially," it was concluded, "the MICV will be supported using the same logistical concepts used in support of the M113 Personnel Carrier when used in the role of the primary fighting vehicle for the mechanized infantry rifle squad."<sup>29</sup>

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<sup>28</sup>Ibid.

<sup>29</sup>Ltr, ATCL-MT, COL Van Auken to Commandant, USAIS, 21 May 1975, subj: Logistical Concepts for MICV OT II.

By the fall of 1975, it was evident that the MICV had some serious design problems. At a 23 September executive review at the Department of the Army, it was decided that the program would have to be slipped by a minimum of eight months. The Project Manager was tasked to develop a program which would incorporate needed changes in the design prototype.<sup>30</sup> Among the most serious problems was one dealing with the transmission. During his visit to the Logistics Center on 6 October, General DePuy expressed concern that the MICV PM was trying to "trade off" transmission problems. He asked MG Graham to investigate on a low key basis.<sup>31</sup> At a meeting of the MICV SAG at TRADOC Headquarters, attended by LOGC representatives, there was extensive discussion of the transmission problem and of the corrections proposed by the manufacturer, General Electric. It was decided to proceed with testing some MICVs equipped with Allison transmissions. January 1976 was the target date for the selection of the transmission by the Project Manager.<sup>32</sup>

General DePuy also expressed his desire to change mechanized infantry tactics to the "panzergrenadiere" concept. Since the MICV fielding was to be delayed, he directed that the M113A1 be adapted quickly and cheaply to a fighting vehicle configuration. A meeting was held on 16 October 1975 at Fort Benning among General DePuy, MG Starry, and MG Latham to develop requirements and possible courses of action for an Interim Infantry Fighting Vehicle (IIFV).<sup>33</sup> However, a COEA on this vehicle showed that the IIFV was not economically feasible. Consequently, on 2 June 1976, General DePuy dropped plans for its development.

On 6-9 April 1976, Major Lindquist of the Materiel Directorate attended an Integrated Logistics Support (ILS) Management Team meeting at Fort Benning. The review indicated that the logistics aspects of ILS, including provisioning, basic issue items, and test support, were proceeding satisfactorily. However, serious deficiencies in the service school training in support of the MICV OT II were discovered. The LOGC Training and Education Directorate, the Ordnance Center and School, and the Quartermaster School agreed to work together to resolve these problems.

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<sup>30</sup> MFR, ATCL-MT, COL Van Auken to DCG, LOGC, n. d. (fall 1975), subj: Mechanized Infantry Combat Vehicle (MICV) XM723.

<sup>31</sup> DF, ATCL-MT, COL Van Auken to ODCSOPS, LOGC, 24 November 1975, subj: Synopsis of Pertinent Discussion/Requirements Generated during Visit of General DePuy.

<sup>32</sup> Ibid.

<sup>33</sup> MFR, ATCL-MT, COL Van Auken to DCG, LOGC, n. d. (fall 1975), subj: Mechanized Infantry Combat Vehicle (MICV) XM723.

On 29 April 1976, LTG George Sammet, Jr., Deputy Commander, Materiel Development, DARCOM, sent General DePuy a personal letter requesting that the MICV system requirement be changed to 225 Mean Miles Between Failure (MMBF) for the MICV/20mm and 330 MMBF for the MICV/25mm with no subsystem criteria and that this restructuring of criteria be done before the resumption of DT II/OT II testing.<sup>34</sup> TRADOC requested input from the Logistics Center, Infantry School and Armor School. The DARCOM proposal was staffed within the Logistics Center, and a nonconcurrency with supporting rationale was sent to TRADOC over the signature of the Logistics Center Commander.<sup>35</sup> This position, as well as that of the USAIS, was incorporated into a proposed TRADOC position. The reply--that the 975 MMBF be retained--was signed by General DePuy on 7 June 1976. The justification was that the existing 20mm weapon should not be expected to meet the criteria for the 25mm weapon. MICV reliability criteria, it was recommended, should be "reevaluated" after DT II/OT II and prior to the ASARC/DSARC in June 1977.<sup>36</sup>

The Department of the Army MICV Task Force redirected the MICV program in September 1976. The MICV/20mm was to continue to be developed, but the 25mm weapon was to be fielded in the MICV-TBAT configuration. TRADOC and DARCOM joint working groups had attempted to develop reliability criteria for the MICV-TBAT but had been frustrated by DARCOM's position that such criteria must be "attainable." TRADOC personnel felt that DARCOM was attempting to use the MICV-TBAT to "get well" on MICV reliability and was being overly conservative.<sup>37</sup>

One of the most difficult challenges facing the Logistics Center during the MICV development was to define and fulfill its role in the construction of the MICV COEA. On 22 August 1975, a meeting was held within the Logistics Center of representatives from various directorates and the ODCSOPS. The discussion revealed some differences of opinion about which directorate was responsible for developing the Center's contribution to the COEA. Operations Analysis Directorate representatives

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<sup>34</sup> Ltr, DRCQA-E, General Sammet to General DePuy, 29 April 1976.

<sup>35</sup> Msg, ATCL-CG, MG Graham to CG, TRADOC, 121530Z May 76, subj: MICV Reliability.

<sup>36</sup> MFR, ATCL-MT, LTC Robert S. Antkowiak to D, Materiel, 4 January 1977, subj: MICV Reliability Requirements.

<sup>37</sup> Ibid.

noted that LOGC input to nonproponent COEA was the responsibility of the Materiel Directorate, although they offered to assist by providing necessary data.<sup>38</sup> The problem basically was that neither the Logistics Center nor TRADOC had ever defined the exact role of the Logistics Center in support of nonproponent COEA. Eventually, however, Materiel Directorate accepted the responsibility for fulfilling the Center's mission in developing the MICV COEA. On 2 June 1976, Colonel Palmer and Major Lindquist of the Materiel Directorate met with Mr. Brugh and Mr. Lee of the TRADOC Resource Analysis Office in order to discuss the MICV COEA. The TRADOC representatives were concerned about ascertaining the cost to change from the current General Support system to Combat Oriented General Support (COGS) in a materiel-oriented COEA. The Logistics Center's position was that one or another support system should be accepted as the basis for the study; and, using that system, the cost difference should be calculated between the different hardware candidates. The LOGC rationale was based on the fact that no specific piece of materiel was inherently tied to the COGS concept. The meeting readily displayed the urgent need for the Logistics Center and TRADOC to develop ground rules and data element requirements for LOGC input to nonproponent COEAs. The alternative--taking each COEA on a case by case basis--was wasteful and inefficient.

On 7 July 1976, the Infantry School requested the assistance of the Logistics Center to obtain needed data for the MICV COEA.<sup>39</sup> Materiel Directorate did most of the work in developing this data; however, it received help from Concepts and Doctrine, Evaluation and Test, and Organization Directorates, as well as from the Quartermaster and Missile and Munitions Schools.<sup>40</sup> The resulting data was sent to the Infantry School on 27 August 1976.<sup>41</sup> The manner in which this was accomplished,

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DF, ATCL-MT, MAJ Richard B. Lindquist to D, Materiel, 25 August 1975, subj: Memorandum of Meeting: Impact of the Mechanized Infantry Combat Vehicle (MICV) on Logistics Doctrine, Organization, and Training.

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Ltr, ATSH-MV, COL Jay A. Hatch, Director of Combat Developments, USAIS, to Commander, USALOGC (ATCL-MT), 7 July 1976, subj: Logistics Center Input to MICV COEA Operating and Support Costs.

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MFR, ATCL-MT, 25 August 1976, subj: Logistics Center Input to MICV COEA Operating and Support Costs.

<sup>41</sup>

Ltr, ATCL-MT, COL Carroll to Commandant, USAIS, 27 August 1976, subj: Logistics Center Input to MICV COEA Operating and Support Costs.



without prior experience or guidance, was exemplary. It was in the words of Mr. Henry Alley, Deputy Director of Materiel, "Outstanding pioneer work."<sup>42</sup>

XM-1 Tank Program. This program came into existence in September 1972, when the Project Manager's office was established. The tank which is being developed will have improvements in almost every area over its predecessors: increased firepower, greater mobility and agility, far greater speed, and a better design, with special armor, to make it highly survivable. The tank is meant to withstand the stress of an enemy hit and continue to fight.

On 14 August 1974, the Commanding General of TRADOC directed that a Tank Special Study Group (TSSG) be formed at the Armor Center, Fort Knox, Kentucky, to review the requirements for the XM-1 from the User's point of view. Shortly after the Group was organized, it requested from the Logistics Center a review of the "Logistical Concept" of the Materiel Need document.<sup>43</sup> The Materiel Directorate, in turn, received assistance in this task from the Quartermaster and Transportation Schools and the Ordnance Center and School.<sup>44</sup> The consolidated response was sent back to the Armor Center on 30 January 1975.<sup>45</sup>

The Logistics Center also provided a member for the XM-1 Source Selection Evaluation Board (SSEB). The Ordnance Center and School provided another member. The XM-1 completed the DT/OT I at Aberdeen Proving Grounds on 30 April 1976, and in the ensuing months, the SSEB worked on developing a recommendation on which candidate--General Motors or Chrysler--should be finally selected. Concurrently, the Coordinated Test Program II (CTP II) for the XM-1 was being reviewed by the Logistics Center. The Center's comments were to be forwarded to TRADOC Headquarters and consolidated into the official TRADOC position. Finally, the LOGC provided data information for the preparation of the COEA, which was completed during FY 77 and concurred in by the Logistics Center.

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<sup>42</sup>Note, ATCL-M, Mr. Henry Alley to Chief of Staff, LOGC, 26 August 1976.

<sup>43</sup>Ltr, ATZK-TSSG, MAJ Orville L. Brock, Administrative Officer, US Army Armor Center and Fort Knox, to Commander, USALOGC (ATCL-MT), 20 December 1974, subj: Review of the Logistical Concept for the XM1 Tank.

<sup>44</sup>MFR, ATCL-MT, CW2 Robert A. McFadden, 30 December 1974, subj: Review of the Logistical Concept for the XM1 Tank.

<sup>45</sup>Ltr, ATCL-MT, COL Van Auken to Commander, US Army Armor Center and Fort Knox (ATZK-TSSG), 30 January 1975, subj: Review of the Logistical Concept for the XM1 Tank.

## VI

### AUTOMATED TEST EQUIPMENT

The Land Combat Support System (LCSS). This system is used for fault isolation and verification of repair for selected elements of the TOW, Dragon, Shillelagh, and Lance missile systems. Current doctrine (1976) prescribed that each active Army division would have one Ordnance Missile Support Company (detachment) organized around the capability and capacity of one LCSS for Direct Support of anti-tank missiles. Additional LCSS were authorized at Corps level for backup support plus area support for Lance and other systems. There were no plans, as of mid-1976, to procure additional LCSS. Procurement under the technical data package existing at that time was to require three to five years. However, increases of TOW, Dragon, and, to some extent, Shillelagh missile systems by the mid-1970s had created a workload which taxed the capability of one LCSS to provide the required support in a division. This was demonstrated during a test (Dragon OT III A) held at Fort Bragg, North Carolina, from 3 November to 12 December 1975. The results showed that one LCSS, with personnel, equipment, and tools, as authorized in appropriate TOEs, can support a mix of approximately 500 TOW, Dragon, and Shillelagh missile systems.

The Land Combat Support System uses first generation automated test equipment; its history can be traced back to the 1950s. By 1976, there were 44 sets of LCSS available worldwide, committed as follows: one each in Korea and Hawaii, fourteen each in USAREUR and FORSCOM, two each in MICOM (United States Army Missile Command) and Anniston (float), six in the Missile and Munitions Center and School, and four at Anniston (mission). MICOM proposed an LCSS long-range improvement plan to support existing weapons systems through the year 2000. This plan proposed seven LCSS improvements: the test adapter, a single van, the printer, and control and display, an analog waveform generator, a digital test unit, and an information storage and display. The test adapter PIP had been approved by the Department of the Army by early 1976, and the single van was scheduled to be next in TRADOC's priority.<sup>1</sup>

Other automatic test equipment was being developed which could alleviate some of the shortfall in the LCSS. Among the more promising items were the MICOM Automatic Test Equipment (MATE), which had been selected for depot support of the I-HAWK, and the ECOM Quality Assurance Test Equipment (EQUATE) AN/USM-410, which was later selected for fault isolation of printed circuit boards at GS level for the AN TSQ-73 and the TACFIRE systems. Additional TACFIRE support tasks were also being considered for EQUATE.

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Staff Study, LOGC Materiel Directorate, 10 February 1976, subj: Land Combat Support System (LCSS).

In late 1975, a message from USAMICOM to TRADOC quoted DARCOM as stating that (1) USAREUR still opposes the LCSS, (2) there are not enough LCSSs in Europe to support all missile systems, (3) Europe does not want to go outside the division for missile support and (4) Europe wants a smaller, more mobile system; not LCSS. The unconfirmed source of these statements were conversations between Generals DePuy and Blanchard. The Logistics Center and the MMCS met with MICOM on 19 December 1975 for initial discussions to define a course of action relative to USAREUR's comments. In view of this tasking, the LOGC, with MMCS concurrence, proposed to TRADOC that a conference scheduled for January 1976 at Redstone to develop LCSS Long-Range Improvement Program be postponed one month and the original agenda be expanded to include discussions on items resulting from the 19 December 1975 meeting. The purpose was to develop a dialogue leading to alternative approaches which should be examined prior to a new development program. A message was sent to USAREUR asking them to comment on the ills of the LCSS and what suggestions they have for corrective actions. USAREUR was also asked to provide recommendations for development of characteristics for a replacement system.

In January 1976, the Armaments and Missiles (A&M) Division, Materiel Directorate, rescinded the May 1975 request for information from all MACOMs on their experience with LCSS movements. During the period May 1975 to January 1976, reports of fourteen separate moves were received from units within CONUS, USAREUR, and Korea. There were no instances reported where displacement alone was considered to have caused degradation of the LCSS. Reports did indicate that preparation for movement was extremely important and that tactical generators caused many problems. This was particularly evident where units use commercial power and convertors for normal operations in garrison. The information gathered was used in succeeding LCSS actions.

A&M Division provided assistance to the FORSCOM staff in the preparation of an LCSS briefing given to the FORSCOM Commander (General Bernard Rogers) on 4 February. It was an information briefing which identified no particular problems except personnel and operational availability. The staff emphasized that the LOGC and MICOM are working closely to enhance LCSS capability. They indicated that FORSCOM is a relatively new user of the LCSS and had not yet fully loaded the system; consequently, they would not have a FORSCOM position at the LCSS conference in February.

A&M Division conducted a review of MICOM's assessment of the LCSS and provided a LOGC position in January. Comments were made relative to (1) the inherent danger of misinterpretation of conclusions based on a controlled data collection program unless it was completely understood, (2) the 30 percent utilization of the test equipment, (3) the difficulty of operations and, (4) the necessity to have an active program for procurement of replacement parts for those which are obsolete.

The Missile and Munitions Center and School hosted a LCSS Conference on 18-19 February which was attended by representatives of all overseas commands (except USAREUR), TRADOC (including A&M Division representatives), DARCOM, and FORSCOM organizations involved with LCSS. Participants addressed the need for LCSS product improvement, future requirements, use of alternative test equipment such as ATSS, results of DRAGON OT III A, and training requirements. Both USAREUR and the Logistics Center presented position papers. The Logistics Center's position included the following:<sup>2</sup>

1. LCSS can be moved without inducing severe, time-consuming maintenance actions; thus movement is not a constraint to doctrine.
2. The LCSS should be assigned to Division level, not grouped at Corps level, for responsive support during hostilities.
3. The authorization of a second LCSS with operators (MOS 27B) per division is not a feasible solution. All LCSS except two floats are committed to tactical units (30) or used in CONUS training (6) and logistics support bases (6).
4. A 100% increase in authorization of MOS 27B to each division having a full complement of missiles is necessary in order to keep up with the workload without working twelve hour, seven day shifts.
5. Intensive management of CMF 27, especially 27B, by MILPERCEN is necessary.
6. LCSS product improvements in two areas (single van and test adapter) offer the greatest increase in efficiency and capability. The remainder of MICOM's proposed fifty million dollar PIP should be held in abeyance pending outcome of renewed TRADOC/DARCOM efforts on the Automatic Test Support System program.
7. The ATSS program as a part of its mission should be structured to replace LCSS requirements, thereby relieving LCSS workload as expeditiously as possible.
8. A new dedicated development to replace only the LCSS should not be undertaken.

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Fact Sheet, LOGC Materiel Directorate, 17 February 1976, subj: Land Combat Support System (LCSS).



9. The transfer of some LCSS workload (e.g., verification of repair) to the presently authorized contact test sets can reduce LCSS demands. Doctrine will incorporate this concept.
10. Dragon tracker workload on LCSS can be reduced one-third by incorporation of plug-in vice solder-type connectors permitting test by quick substitution in lieu of test by the LCSS.

The results of this conference was a Long-Range Improvement Program, which included Single Van and Test Adapter PIP, approval of an Essential Repair Parts List, and agreement on the essentiality of a training program to provide an adequate number of operators and on revised maintenance procedures. This plan was approved by the Logistics Center in March and by TRADOC in June 1976 and served as policy guidance on the future of the LCSS. In March, the A&M Division reviewed, revised and forwarded, made specific recommendations pertaining to training, personnel quality and the equipment. This plan required the full cooperation of DARCOM, TRADOC, and MILPERCEN to be executed.

In a separate action, but in accordance with the Long-Range LCSS plan, the following product improvement proposals were justified and forwarded to TRADOC by LOGC in March 1976:

- (1) The proposal to reconfigure the LCSS test station and the repair van into a semitrailer, with the provision that a shelter of the S-280 type would still be required for performance or repairs which are incompatible with and cannot be done in the same shop where electronic and optical repairs are done.
- (2) The proposal to product improve the test adapter in the AN/TSG 93 van. Problems have been experienced with sticking relays, warped printed circuit board and connectors, as well as finding qualified vendors to manufacture replacements. This PIP was approved for engineer development in FY 77.
- (3) The Logistics Center nonconcurrence with the third PIP for an improved control and display system. This PIP would update the LCSS by inclusion of a mini-computer, magnetic storage medium, graphic displays, programmable signal conditioner and other ancillary chassis. The cost is estimated at \$48.6m for 44 systems. The A&M Division recommended that the ATSS LOA be used as the vehicle to perform a COEA on competing alternatives to improve anti-tank missile support.
- (4) A letter reiterating the USAMMCS and the LOGC's strong support for single van product improvement program (PIP) was dispatched to TRADOC for that Headquarter's use before the DA General Officers' PIP Review Board. In addition, personal discussions were initiated by the Director of Materiel with members of the TRADOC, DARCOM and

DA DCSLOG staffs to emphasize the importance and urgency of favorable action by the review board on this PIP. The review board deferred action on the single van PIP pending development of an interim support plan for all antitank missile systems wherein the LCSS is the TMDE at DS/GS units.

DA DCSLOG directed DARCOM, in coordination with TRADOC, to develop an interim plan by 30 June 1976 for support of all missiles supported by the LCSS. The message also directed that a date be provided by 15 June 1976 as to when a long-range plan could be provided. DARCOM passed their action to MICOM, and TRADOC passed the coordinating responsibility to LOGC.

MICOM, LOGC and MMCS representatives met at Redstone Arsenal, Alabama, to develop the interim plan which, by direction, included all active Army division/Corps and separate brigades. The National Guard and reserve components which either had or were scheduled to receive TOW/ Dragon or Shillelagh missiles were also included. By later direction from the Department of the Army, the Eighth Army's (Korea) Commander's request for an additional LCSS was also addressed. Although no formal position on this request was made at the Redstone conference, it was later agreed that the Logistics Center's consideration of this request be inserted in the interim plan. The plan, as developed on 10 June 1976, was briefed to the LOGC Deputy Commander, the Chief of Staff, and Directorate representatives on 15 June. The following day, General Burdeshaw and the TRADOC staff were also briefed. No substantial changes were made in the plan as the result of these briefings. However, on 8 September, MG Graham, while in Korea, received an informal briefing on the Eighth Army's request for a second LCSS and offered his support to help obtain the equipment.

The interim plan required additional Dragon test sets and the TOW Field Test Set for support equipment in the separate brigades, National Guard, and the reserve components. It included essential improvements to the LCSS as stated in the MMCS letter of 15 March 1976, and the LOGC indorsement of 26 March for a TRADOC position on the LCSS long-range improvement. It also included equipment and personnel additions recommended for missile support in the Dragon OT IIIA report of 4 June 1976. All equipment was type classified standard except the TOW Field Test Set. Although the plan was to be at the Department of the Army on 30 June, it actually was not sent until 12 July. The delay was caused by a controversy which developed between MICOM and MMCS about the capabilities of the TOW Field Test Set versus those of the Contact Support Set. It was decided that a comparative evaluation would be made conducted jointly by the two agencies. The evaluation was to be completed by January 1977.

A letter was dispatched to TRADOC requesting guidance on TRADOC's responsibility in the combat development of equipment intended for use of National Guard and Reserve Components and for which there is no active Army requirement. Guidance is necessary should missile support for these forces require the use of the TOW Field Test Set which was developed solely for Foreign Military Sales and the US Marine Corps.

A letter was also sent to DA requesting forecasted densities of TOW, Dragon, and Shillelagh missiles in the Active Army, National Guard and Reserve Components. Time frames for which information was requested were FY 1977 through 1985. Information is pertinent to development of the interim and long-range support plans for these missiles directed by DALO-SML, dated 18 May 76.

The LOGC position on LCSS was that only two LCSS product improvements should be supported by TRADOC: (1) reconfiguration to a single van and (2) improve the test adapter. All other PIPs should be held in abeyance pending outcome of the ATSS study. The LOGC Command Group approved the interim plan for support of Separate Brigades, Reserves and National Guard. No Reserve or National Guard units would be satellited on active Army division.

A coordination conference was held at MICOM on 21 September 1976 on the MICOM Long-Range Plan (LRP) for support of missile materiel. A message from the DA DCSLOG on 18 May 1976 had tasked DARCOM to develop and coordinate with TRADOC this LRP which would identify replacement equipment for the LCSS, milestones for development, and estimated costs. The Missile and Munitions Center and School had been tasked by the Logistics Center to represent the LOGC in this effort. The LRP developed by MICOM and the MMCS advanced the Missile Automatic Test Equipment (MATE) as the universal replacement for LCSS, a position to which LOGC representatives could not agree, for MATE did not meet all the requirements expected of automated test support equipment. MMCS, however, would not concur with the use of any sort of multiple system test equipment at the Direct Support level. These differences resulted in a MICOM message to DA which requested a six month extension of the original 30 September 1976 in their original tasking message.

Finally, in a related, though separate matter, the TOW Project Office convened a committee on 19 May 1976 to consider a change in maintenance levels for the internal components of the TOW optical sight. The study in support of this recommendation was made as the result of an examination done by Hughes aircraft. The rationale was weak and the cost analysis incomplete. It appeared the basic reason for the recommendation was a repair part management problem; a sufficient number of parts was not being procured to support the failure rate. A study effort was initiated to address all parameters of the problem.

Automated Test Support Systems (ATSS). There are three major reasons why the Army has become so interested in Automated Test Support Systems. First, existing test equipment is not sophisticated enough to diagnose the complex equipment created by modern technology. Second, serious doubts have been raised about the adequacy and efficiency of manual testing. Finally, a variety of standard and commercial test equipment has proliferated in the Army inventory, and each item demands its own specialized training and logistics support. The consequence is high cost and long periods of training.

These problems could be corrected to a large extent if present equipment were phased out and replaced by a new generation of automatic test equipment with new guidelines and regulations to prevent proliferation. On 14 March 1975, a Letter of Agreement between TRADOC and DARCOM was prepared toward this end. The objectives were specifically "to investigate the technical feasibility, employment concepts and operations desirability of developing a family of automatic test support systems (ATSS) to be used for maintenance of Army materiel."<sup>3</sup> Several families of ATSS were to be considered, including electrical, mechanical, optical, hydraulic, and pneumatic. However, each family would utilize the same core equipment consisting of the processor, power supplies, measuring devices, stimuli, computer software, input/output devices, and displays. Each ATSS was to offer a means to automatically test, diagnose, and isolate faults of major items, components, assemblies, subassemblies, modules, and printed circuit boards. A system was to be tailored to the workload of each maintenance level. Different configurations were to be used for each ATSS family.

Even before the Letter of Agreement had been signed, the Logistics Center had been heavily involved in the development of automated test support systems. In August 1974, General DePuy had designated the Center "as the TRADOC focal point for TMDE [Test Measurement and Diagnostic Equipment] combat development matters."<sup>4</sup> Within the Logistics Center, most of the work on ATSS was given to the Materiel Directorate. However, in December 1974, the Operations Analysis Directorate was formally requested by the Materiel Directorate to prepare the COEA for ATSS.<sup>5</sup>

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Quoted in MFR, ATCL-R, Proceedings of the Sixth Meeting of the US Army Logistics Center Advisory Board (LOGCAB), 19-20 October 1976, US Army Logistics Center, p. 10-6.

4

Ltr, ATCL-SP, General W. W. DePuy to General Henry A. Miley, Jr., Commander, AMC, 16 August 1974.

5

MFR, ATCL-MC, COL Herman Ertlschweiger, Chief, C-E Division, to COL Van Auken, Director, Materiel Directorate, 3 December 1974, subj; OAD Support for ATSS.



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LOGC HISTORICAL SUMMARY. (RCS-HIS-6 (R2)). 1 JULY 1974 TO 30 SE--ETC(U)  
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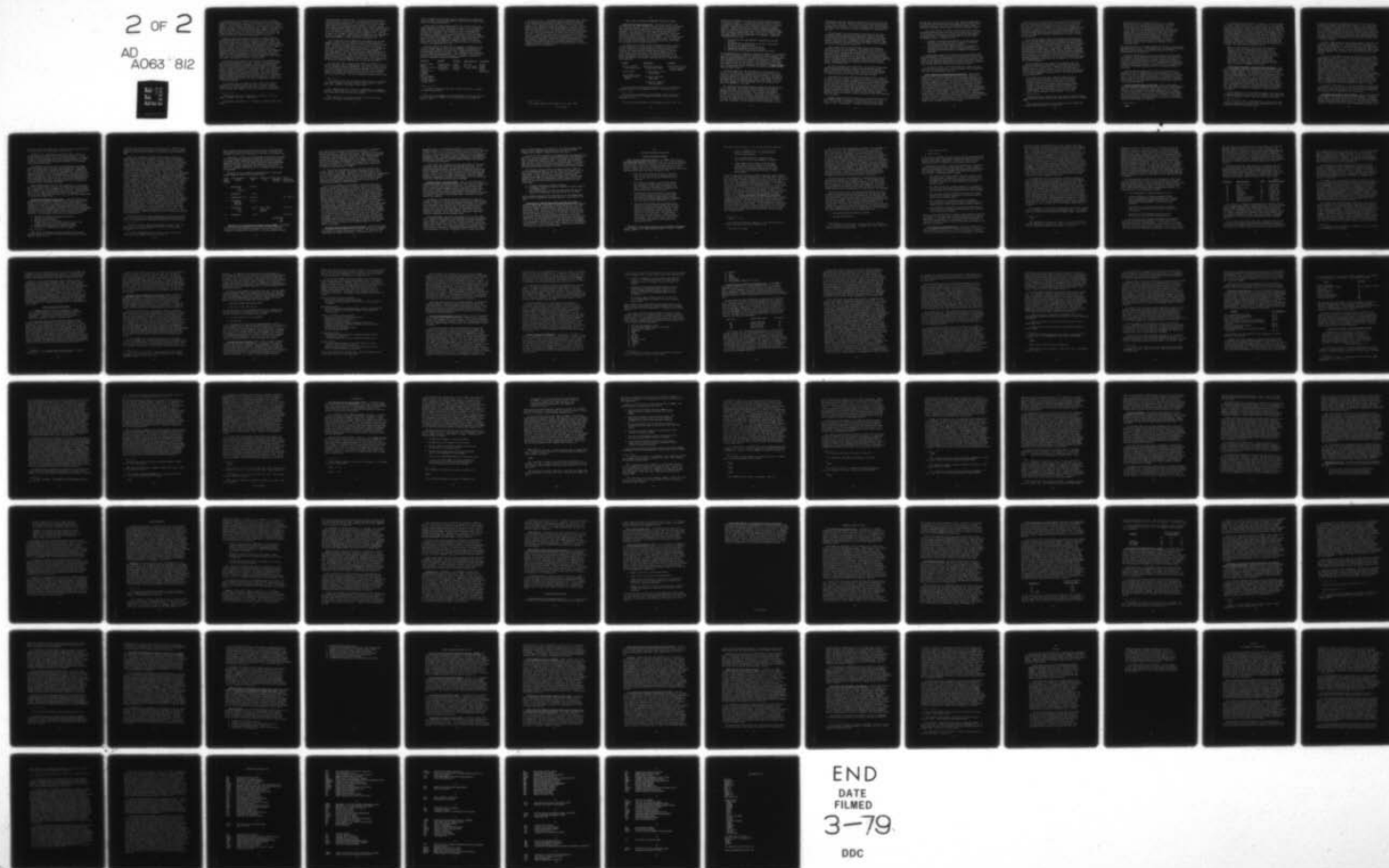
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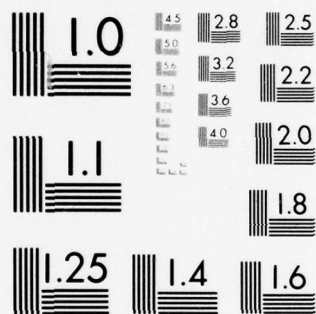
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MICROCOPY RESOLUTION TEST CHART  
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Unfortunately, ATSS development proceeded at a rather slow pace during the following year. Much of the problem rested with the DARCOM community. The Army Materiel Command only informally tasked the Frankford Arsenal to be the proponent; and, without a formal tasking, the Arsenal appeared reluctant to move ahead with the work. Indeed, Arsenal personnel requested MG Graham to contact BG Griffith (R&D, DARCOM) to complain about the lack of action. One reason why DARCOM was reluctant to task Frankford Arsenal was that the Arsenal was scheduled to be closed, and no decision had been reached about the transfer of personnel.<sup>6</sup>

Meanwhile, the United States Army Electronics Command (ECOM) was promoting the EQUATE as the system to be used as the basic module for the Automatic Test Support Systems. EQUATE was a general purpose automatic test system which could support communication-electronics systems from DC to 18 GHZ. It was built with year end OMA money by ECOM to perform quality assurance checks on communications equipment in depots. ECOM had been involved in practically all the meetings and discussions regarding the ATSS project and was credited by DARCOM with providing the funding and technical information for the approved LOA. Thus, ECOM seemed to be the obvious Command to serve as the DARCOM proponent for ATSS. The fact that DARCOM favored Frankford Arsenal over ECOM resulted from ECOM's single-minded insistence on using EQUATE.

The problem was that ECOM was not adhering to the standardization provisions of the approved LOA on ATSS. Instead of identifying changes that could make EQUATE more compatible with the LOA standardization efforts and cooperating with Frankford Arsenal, ECOM put its main effort on trying to find users that would need EQUATE. Once the maximum numbers of users were committed to the EQUATE, this system would automatically become the ATSS for the entire Army. This would ordinarily not have caused adverse repercussions; however, AMSAA, MMC, and the Frankford Arsenal all believed that the EQUATE could not be standardized without extensive modifications and extremely high cost. In short, if DARCOM accepted ECOM's position, the entire standardization effort could be severely retarded.<sup>7</sup>

On 16 January 1976, the Frankford Arsenal finally was formally designated as the DARCOM proponent for ATSS. Frankford's original approach was to make a long-term study; however, General Graham suggested, instead, that emphasis be placed on solving the ATE problems of

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MFR, ATCL-MC, COL Paul A. Vnencak, C, C-E Division, to COL Van Auken, 2 December 1975, subj: ATSS Program.

7

Talking Paper, ATCL-MC, Mr. C. G. Adenauer, 26 February 1976, subj: EQUATE.

selected weapons systems and users. In response, Frankford proposed a five million dollar plan that would provide hardware, software, and expertise to participating users. Participation was strictly voluntary since DARCOM had not directed project managers to use ATSS. Unlike ECOM's plan, this implementation plan did include modifying existing and future EQUATE systems to meet ATSS specifications. This Frankford approach was to provide for a standard core system, standard interface, and the use of the operational performance analysis language (OPAL). Ongoing automatic test equipment programs were to be phased into the ATSS program as quickly as possible. These included ASA, EW/SIGINT items, ARTAD (TSQ-73 and TACFIRE), and MCC (calibration configuration).<sup>8</sup>

The Training and Doctrine Command also had problems with the ATSS program. A draft Letter of Instruction (LOI) had been submitted to TRADOC Headquarters in August 1975 for approval of an ATSS Special Study Group. The Group's principal mission was "to insure the effective utilization of Army resources and the elimination of proliferation and duplication of automatic test measurement diagnostic equipment."<sup>9</sup> There were, however, several staff objections at TRADOC Headquarters to the establishment of the Group, mainly based on reservations about the expenditure of resources. These objections were overcome after several months, and the LOI was approved on 19 March 1976. The Director of the Materiel Directorate was named the Group's chairman, and a representative of the materiel developer (DARCOM) was to be the vice-chairman.<sup>10</sup>

By March 1976, then, it appeared that TRADOC and DARCOM were set to proceed vigorously with the ATSS program. The Logistics Center did not feel the Frankford Arsenal implementation plan was the ultimate solution to the ATSS problem, but there was general agreement that it would at least get the program started and would provide for some standardized hardware and software that prospective users would be able to use to solve their ATE problems. Once test equipment was actually given to the

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Fact Sheet, ATCL-MC, COL Van Auken, 12 April 1976, subj: Automatic Test Support Programs; Fact Sheet, ATCL-MC, COL Van Auken, 12 March 1976, subj: Automatic Test Support System (ATSS).

9

Ltr, ATCD-SC-E, MG W. H. Vinson, Jr., TRADOC DCSCD, to Commander, USALOGC, 19 March 1976, subj: Letter of Instruction (LOI) for Automatic Test Support System Special Study Group (ATSSG).

10

MFR, ATCL-MC, COL Van Auken to BG Vuley, 31 March 1976, subj: Automatic Test Support Systems LOI Actions.



users, an important step towards Army-wide standardization of ATE would have been taken. Therefore, the Logistics Center felt that TRADOC should support the Frankford approach.<sup>11</sup>

In May 1976, the Special Study Group met for the first time. The initial meeting was hosted by the Logistics Center. Both the TRADOC and DARCOM communities were well represented by nearly fifty participants from activities involved in the instruction, use, or development of automatic test equipment. Two of the most significant results of the meeting were a revision of the Special Study Group's charter and DPROC for a EW/SIGINT ATSS configuration. The latter was particularly important because of urgent requirements from the Army Security Agency (ASA). Other results were the agreement of TRASANA to support the analytical effort and the identification of other potential users in the aviation, missiles, and tank-automotive fields.

Both the Commander of TRADOC and the Commander of DARCOM agreed that the ATSS "family" concept was the correct approach to managing and controlling the ATE commodity within the Army. DARCOM elevated ATSS to product manager status in July 1976. In the meantime, other candidates for using ATSS were being identified. These included the Patriot Missile system and the Advanced Attack Helicopter. A complete itemization of potential candidates included the following:<sup>12</sup>

<u>Electronic</u>	<u>Aviation</u>	<u>Missiles</u>	<u>Tank-Automotive</u>	<u>ASA Systems</u>
Tactical radios	Advanced Attack	I-Hawk	XM-1 Tank	MULTEWS
TACFIRE	Helicopter	Patriot	Mech Inf Combat	TACJAM
AN/TTC-39 (TRI-TAC	Advanced Scout	Hellfire	Vehicle (MICV)	ACTELIS
Switch)	Helicopter	Roland		TACELIS
AN/TPQ-36 & 37				CEFLY LANCER
(MALOR)				
AN/TSQ-73				
Battery Computer				
Systems (BCS)				
Tactical Operations				
Systems (TOS)				

11

Fact Sheet, ATCL-MC, COL Van Auken, 12 March 1976, subj: Automatic Test Support System (ATSS).

12

MFR, ATCL-R, Proceedings of the Sixth Meeting of the US Army Logistics Center Advisory Board (LOGCAB), 19-20 October 1976, US Army Logistics Center, p. 10-7.

By the end of FY 76, developments in ATSS seemed promising. The EW/SIGINT DPROC was being considered by TRADOC and DARCOM for expansion into a C-E/ATSS ROC which would be broader in scope and would cover support of all communication-electronic materiel. The Signal School, meanwhile, was prepared to conduct an independent evaluation report on data resulting from OT III of the EQUATE, which was planned for late 1976. The Logistic Center's plan for working on ATSS involved initially tackling the electronic workload, the Army's most pressing problem in this area. Subassemblies and printed circuit boards which required support needed to be identified, and cost benefits had to be determined. The avionics, electronics, and missile configurations seemed to be the most promising candidates in terms of insuring cost effectiveness. Finally, the Director of Materiel Directorate suggested to the LOGC Commanding General that ATSS "be given the priority equal to the weapons systems that will be supported."<sup>13</sup>

## VII

### RETAIL LEVEL LOGISTICS AND MANAGEMENT INFORMATION SYSTEMS

Combat Service Support System (CS3). The origins of CS3 can be traced back to 1956, when the Army initiated various studies on automated data processing systems. From these studies evolved requirements for five areas within the Command and Control Information System (CCIS-70) framework: fire support, logistics, personnel and administration, operations, and intelligence. In May 1965, the Department of the Army approved an implementation plan for the development of the Automatic Data Systems within the Army in the Field (ADSAF). The plan restructured the five areas mentioned above into three ADSAF systems: the Tactical Fire Direction System (TACFIRE), the Tactical Operations System (TOS), and the Combat Service Support System (CS3).<sup>1</sup>

The Combat Service Support System is designed to provide, through integrated automation, a computer-supported logistics and personnel system. Through the efficient application of data processing, it increases the responsiveness of combat service support to the Army in the field. Using the versatile IBM 360/30 System mounted in a mobile configuration, CS3 employs a van-mounted system that can be moved when and where tactical units of the field army deploy.<sup>2</sup> The supply, maintenance, and personnel subsystems which are supported by CS3 are as follows:

<u>Supply</u>	<u>Maintenance</u>	<u>Personnel</u>
Division Logistics System (DLOGS)-360	Maintenance Reporting and Management (MRM):	Standard Installation/ Division Personnel System (SIDPERS)
Property Book	(a) Maintenance Control System (MCS)	
Army Equipment Status Reporting System (AESRS)	(b) Modification Work Order (MWO)	
	(c) Materiel Readiness Reporting (MRR)	

On 30 July 1974, the Assistant Secretary of the Army for Financial Management approved the recommendation of the A staff that CS3 be

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<sup>1</sup> United States Army Computer Systems Command, Project Master Plan (PMP) for the Combat Service Support System (CS3), Division Concept, September 1975, p. 2.

<sup>2</sup> Fact Sheet, US Army Computer Systems Command, May 1976, subj: CS3.

extended to the balance of the Army (earlier tests had taken place at Forts Hood and Campbell). The approved extension schedule called for installation to begin in the 82d Airborne Division in April 1975, with subsequent installations in other divisions to follow at two month intervals. Shortly thereafter, the Logistics Center was tasked by TRADOC to coordinate the resolution of twelve FORSCOM recommendations emanating from the division level test of CS3 at Fort Campbell in March 1974. A working conference was hosted by the LOGC on 8 October 1974, with PACDA, CACDA, and the Signal School in attendance. Significant recommendations dealt with:

1. The utility of the 2780 high-speed transceivers within the division.
2. The feasibility of transferring the terminal (transceiver) section to the Signal Battalion.
3. Allocations and location of PCM equipment.
4. Command and operational control for the DDC.
5. The revision of the organizational models for the DDC.

The recommendations were forwarded by Headquarters TRADOC to the Department of the Army for approval, which was obtained with minor exceptions. The HQDA also provided guidance for the implementation of the recommendations. This new guidance affected the organization and equipment allocations which had been tested at Fort Campbell. For example, all transceivers were eliminated from the division, data reduction capability was added to the DMMC, the DDC was left assigned to the DISCOM for command purposes only, and operational control of the DDC was vested in the office of the Division Chief of Staff.

The 360-30 computer for CS3 was turned over to the 82d Airborne Division on 23 April 1975. The property book conversion/pre-edit had been run on the installation hardware three days earlier. The initial conversion process for class IX was completed on 24 April, and class IX was operational by the following day. Also, by the spring of 1975, the MWO module had been successfully implemented at Fort Bragg. The total user input amounted to 7546 transactions; with only 63 rejects, the error rate amounted to .8 percent.

The original Division Logistics System (DLOGS) was designed for use on the Univac 1005. During 1974, DLOGS was translated into IBM 360 language and became the CS3 supply system of record, subsequently designated the CS3 supply subsystem. This subsystem was gradually extended to all active Army divisions. During the third quarter of FY 76, the 3d Infantry Division conversion from DLOGS to the CS3 supply subsystem was completed, and the subsystem was installed in the newly activated 5th Infantry Division during 22 March--10 May 1976. On 18 June 1976, conversion of the 2d Infantry Division from DLOGS to the new



subsystem was completed. During the summer and early fall of 1976, CS3 was extended to the 25th Infantry Division and the 4th Infantry Division at Fort Carson, Colorado. At the end of September 1976, the CS3 supply subsystem was operational in 13 active divisions and one separate brigade. Extension to the remaining 3 divisions was scheduled for completion in May 1977.

During November 1975, work was begun to re-program the CS3 supply subsystem to include several system enhancements, such as asking an interchangeable and substitutability capability, automation of classes II and IV, addition of NSL transactions to the Daily Unit Transaction Register, and provisions to accommodate the Air Mobile Division. These system enhancements, contained in System Change Request (SCR) 111-R038-114, were to be completed by January 1977.

By the summer of 1974, the maintenance control subsystem was in operation at Forts Hood and Campbell. This subsystem is a workload accounting system for use in the DS/GS production control office at the shop level and in the maintenance battalion materiel office or Division Management Center, depending on the TOE series. The modification work order accounting subsystem was also operational at Forts Hood and Campbell; however, problems existed in the automated semi-annual validation capability and in the system's ability to produce an accurate division roll-up report. These deficiencies were addressed in SCP 109-07-00, executed during 18-20 February 1975.

One SCP was validated on 23 August 1974. The original SCP contained eighteen System Change Request actions affecting both MCS and MWO. While all MCS SCR actions were validated, four of the nine MWO actions were not able to be. The Logistic Center's position was that MWO not be further proliferated until these four SCRs were validated.

During the fall of 1974, the draft of Field Manual 38-17, as well as the lesson plans for CS3 MRM, was rewritten and put into a new format in an effort to clarify, update, and simplify use of the information provided. The revised manual (TM 38-17) was distributed worldwide in draft during December 1974 for review and comment. During the following winter and spring, comments were received and incorporated into the final version. The initial printing of 1250 copies was distributed to the 1st Cavalry Division, 2d Armored Division, 13th COSCOM, 101st Airborne Division, 82d Airborne Division, 1st Infantry Division, and the Logistics Center. Additional copies were printed to support extension of MRM to the remaining eleven divisions.

A Change Control Coordination Conference on CS3 Maintenance Reporting and Management (MRM) was convened at the Logistics Center on 2 April 1975. All open SCRs for MRM were reviewed and priorities were established for their accomplishment. Attendees included DA DCSLOG, DMIS,

FORSCOM, CSC, and the Logistics Center. Other subjects discussed at the conference included the Materiel Readiness Reporting (MRR), FORSCOM calibration model, CS3 extension, CSC maintenance resource system priorities, and CAMMS (Corps Automated Maintenance Management System).

In the ensuing months, the Logistics Center analyzed the ADP CS3 MRR subsystem and concluded that major modifications would be required if the system's outputs were to be used in the manual preparation of readiness reports. In response, the Department of the Army tasked the Logistics Center, in early 1976, to:

1. Prescribe the necessary modifications to the ADP system for production of the data that could be manually interpolated into the system oriented readiness reports.
2. In coordination with the USACSC, develop time estimates and detailed cost data that would be required to modify the automated item reporting system to accommodate weapon system reporting.

A system change request to the automated system and detailed workload requirements was developed jointly by the Logistics Center and the USACSC and provided to the Department of the Army on 30 June 1976. Upon receipt of the document, HQDA informally advised the Logistics Center that Readiness Reporting requirements were under review and no prediction could be made about when formal direction would be provided.

By the middle of 1976, the CS3 MCS and MWO were complete for the Army except for four divisions. It was anticipated that the subsystems would be fully implemented by June 1977.

Direct Support Unit Standard Supply System (DS4). This system is designed to simplify and standardize the entire direct support unit supply system. It utilizes automatic data processing equipment to the maximum extent possible in order to process functional requirements at the direct support unit level. The system will provide the tools and management information necessary for the unit to accomplish its mission with minimal manual manipulation and data output consistent with the needs of the managers at the direct support level. A manual backup is also furnished in case of equipment failure. The procedures are designed to be simple and understandable and are structured to be accomplished in an automated and routine manner. The Direct Support Unit Standard Supply System is characterized by decentralized operation and management. It offers operational independence which permits maximum support flexibility on the battlefield. Reduced demands are made on the communications systems, and this allows greater choice in the positioning of direct support units throughout the area of operations.

The hub of DS4 is a concurrent posting cycle which utilizes a visual display unit for realtime data access. All requests will be manually edited for completeness and prepared for entry into the system. From that point on, it will be processed automatically unless management intervention is desired or caused due to a previously designated parameter violation or management query. The concurrent posting applies to all transactions that affect the balance maintained at the direct support unit for all items under detailed accounting, such as issues, receipts, and adjustments.<sup>3</sup>

The second Study Advisory Group (SAG) meeting for DS4 was held in July 1974. Several changes, deletions, and additions were incorporated into the General Functional Description, which then was approved with all essential elements of analysis addressed except the type of automated data processing equipment to be used. The final document was printed and distributed in August 1974. In September, a meeting was held with representatives from DA DCSLOG, DA DMIS, CSSEA, and USACSC to determine alternatives and assign responsibilities for the DS4 Economic Analysis (EA). Data for the EA was received from CSSEA and USACSC during November. The preliminary EA lent support to those who favored decentralized hardware configuration rather than the two other alternatives available--centralized hardware configuration and the upgrade of the existing NCR-500 or NCR-399 hardware.

The draft GFSR for DS4 was completed on 28 December 1974, and subsequently published and distributed to SAG member organizations during the week of 6 January 1975. Comments on the draft were to be submitted not later than 12 February, in order that they would be reviewed and/or consolidated prior to their formal review and discussion at the next SAG meeting, to be held in March. At this meeting, Major General Graham noted:<sup>4</sup>

As you know, our DS4 system is primarily aimed at the non-divisional support units; and, while it is called Direct Support, we are dealing with a system that can be applied to General Support units as well. While we are not discussing it here today, the Standard Army Maintenance System is about in the same time frame, and we will probably be looking at hardware requirements for both of these systems simultaneously. That is a factor that should be in your minds. This system must be cost effective. If it isn't,

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<sup>3</sup>Briefing, DS4 Study Advisory Group (SAG) General Functional System Requirement Presentation, United States Army Logistics Center, 26 February 1975.

<sup>4</sup>MFR, ATCL-SSO, Study Advisory Group Minutes, Direct Support Unit Standard Supply System (DS4), 26 March 1975.



we have got to tailor its scope until it is. . . . We are dealing with one of our highest priority efforts in Systems Design, if not the highest for several reasons. The first is that most of us, as functional managers, feel that we can do a better job in supporting the using unit customers with a better job with a better capability in our system for direct support units. So what we develop here should be as near to optimum in providing responsive support to the using units that we can achieve with cost effectiveness. We are also faced with the obsolescence of the NCR-500. It must be replaced as quickly as we can devise a system to replace it. So we have a very serious, tedious, and important task to accomplish today.

During the meeting, all recommended changes were discussed, and agreement was reached on all points. It was decided that the preparation of the DS4 DFSR should continue under the guidelines written in the GFSR, as amended during the SAG meeting.<sup>5</sup>

During the second quarter of FY 76, DA staffing of the final GFSR was completed, and the Assistant Secretary of the Army (FM) approved DS4 as a system. On 20 November 1975, a general officers' meeting was convened to develop DS4 hardware and software acquisition alternatives. A subsequent conference, held from 15 to 17 December 1975, developed and expanded further the alternatives. The results of this conference were utilized at a subsequent decision meeting of the general officers in early 1976.

The draft DFSR was completed late in 1975 and distributed to the Department of the Army Headquarters and major commands in the United States and overseas. Comments were received and analyzed in the ensuing months. The final DS4 DFSR, including some of the comments which had been received, was published and distributed in August 1976. Meanwhile, in the summer of 1976, the Economic Analysis for DFSR was completed and submitted through channels.

Standard Army Maintenance System (SAMS). This is an automated logistical management information system supporting maintenance management functions from the direct/general support retail level up through the wholesale to the Department of the Army Headquarters level. During FY 76/2 the four volumes of the General Functional System Requirements and the four volumes of economic analysis were submitted to the Department of Army staff for review and approval. Meanwhile, preparation of the Detailed Functional System Requirements was initiated. The GFSR was approved without change on 12 May 1975.

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<sup>5</sup>Ibid.



The SAMS DFSR concept was briefed to members of the Fort Lee CSCSG on 21 April 1975 and was accepted. A status review and coordinating conference on SAMS was held at the Logistics Center on 13-14 May 1975. Representatives from the USASA, USACC, TSC, USACSC, USALEA, USAMC, and DADCSLOG participated. The draft of the DFSR was completed in July and distributed worldwide for review and comments. These comments were received in December 1975 and January 1976 and were considered in the revised DFSR which was initiated in January 1976 and completed in July. After printing was completed in August, the DFSR was once more distributed. Meanwhile, the comparative analysis of the Standard Army Maintenance System and the Integrated Maintenance System (IMMS) was completed and submitted to the Department of the Army Headquarters on 19 August 1976. The analysis recognized that...<sup>6</sup>

DMMS is a viable system for installation level management; however, it was not designed for and does not satisfy recognized user level requirements such as reduction and simplification of record keeping and reporting at the user (troop unit) level. This is one of the essential objectives of the SAMS design effort. Additionally, significant portions of the four currently operational processes (subsystems) of DMMS are not automated. This is particularly true in the case [sic] Production Planning and Control (PP&C) and Materiel Management (Shop Supply).

Standard Army Intermediate Level Supply Subsystem (SAILS). This is a multicommand, integrated, automated supply and financial management system developed under the jurisdiction of the US Army Computer Systems Command (USACSC). It is designed to accomplish all stock control, supply management, and related financial management functions between the CONUS wholesale level and the direct support systems. SAILS operates at three levels: the A level (supply and financial management), B level (supply and storage operations), and the A(-) level (theater level supply management). Often the SAILS A and B levels are collocated, in which case they are called simply SAILS AB. Also, an expanded AB system has been developed which is named SAILS ABX. This system is capable of satisfying worldwide supply management requirements, including the capability of supporting medical activities.

By the beginning of FY 75, the CONUS AB package had been installed at eighteen installations including the 1st COSCOM at Fort Bragg, which utilized the COSCOM GS version. Extension resumed in March 1975,

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<sup>6</sup>Ltr, ATCL-SM, BG Vuley to HQDA (DALO-PLS), 19 August 1976, subj: Comparative Analysis of the Standard Army Maintenance System and the Integrated Maintenance Management System.

by which time the SAILS Major Command Level Asset Control System was operational at USARPAC and USAREUR Headquarters. In the second quarter of FY 75, SAILS GS was made operational in WESTPAC. This system was to be replaced by SAILS ABX, for which the functional user procedures and test condition requirements were being developed by the LOGC Support Group (PAC), supplemented by TDY personnel from the Logistics Center at Fort Lee. These procedures and requirements were completed during the late summer of 1976. The ABX system was to replace the TASCOS-S system in Europe and the SAILS AB system in the United States, as well as the 3S system in WESTPAC.

The SAILS B Depot System (Storage Operation Module) Integration Test concluded on 25 September 1974. Installation and the prototype test began the following March, and operation began in the Germersheim Army Depot, Europe, in May 1975. A year later, operations also began in the Pirmasens Medical Depot, Europe. By the end of September 1976, six SCPs had been completed. SCP 6 provided the interlink with the SAILS ABX program.

By June 1976, the CONUS AB package had been installed at 25 CONUS installations. During FY 76, the SAILS AB package was extended to four CONUS installations: Forts Huachuca, Lewis, Eustis, and Meade. Two other installations were scheduled for conversion during the year, Vint Hill Farms and Fort Detrick. However, as a result of a study conducted by a technical assistance team from the Logistics Center to Vint Hill Farms during early November 1975 to develop left of Baseline (LOB) requirements, DA DCSLOG recommended to DA DMIS that SAILS AB not be extended to that site. Fort Detrick was under consideration to be closed and therefore was not extended; if it were not closed, it was to become a satellite installation. Two scrub reviews were conducted during the year with participation from MACOMs, USACSC, and the Logistics Center. In May 1976, the moratorium on extensions was lifted and the remaining CONUS installations were scheduled to receive SAILS by June 1977. A preconversion survey was scheduled for July 1976 at the VII Corps for extension of the SAILS AB COSCOM (GS) module to Europe.

In SAILS AB, three SCRs (12, 13, 14) were released to installations during FY 76. As of 30 June 1976, there were 285 functional open SCRs. Forty-two of these were assigned to SCP 15 and 127 were transferred to ABX, which was to be refined during the following year.

Base Operating Information System (BASOPS). This is the installation level operating information system of the Army Management Information System (AMIS). Its purpose is to assist the installation commander's ability to plan and execute Department of the Army objectives. BASOPS incorporates automated and manual procedures. The major feature of the system is a standard data base to provide management information for all

elements of the using organization. BASOPS was to be replaced by SAILS AB or SAILS ABX at all installations by 30 June 1977.

During FY 75/2, a decision was reached by DA DMIS on whether to extend BASOPS and/or BASOPS Plus to Fort Ritchie, Maryland. It was decided to move Fort Ritchie from the last installation to be converted to SAILS, as then indicated on the SAILS extension schedule, to first, following a successful SAILS IPR and the withdrawal of the existing SAILS extension moratorium.

In accordance with C2, AR 18-1, the second BASOPS System Change Request Review was held at the LOGC on 12 November 1974. Representatives came from DA DMIS, DA DCSLOG, TRADOC Headquarters, FORSCOM, and CSC. Fourteen SCRs were approved for implementation: nine corrected technical deficiencies, and five were approved to accommodate DSS in the BASOPS environment. At the third BASOPS System Change Request Review, held at the Logistics Center on 15 April 1975 with representatives from the same organizations, twelve SCRs were approved for implementation: seven conformed to regulatory requirements, and five were approved to accommodate DSS in the BASOPS environment.

System Change Package 4 was the first BASOPS SCP to be tested live and field validated and was released for implementation during November 1975. Department of the Army Headquarters' three year retention policy was released to the field in February 1976 as an EUCP. During September 1976, the last regularly scheduled SCP (SCP5) was broadcast to the field. By that time, BASOPS was operating at nineteen CONUS installations (15 BASOPS and 4 BASOPS Plus).

Standard Army Ammunition System (SAAS). Ammunition operations and management are not included in standard supply or maintenance systems because they are essential to combat and require high visibility. Instead, as an outgrowth of the Standard Army Logistics System concept established in 1970, the Standard Army Ammunition System was specially designed as a vertical management system for class V supply and maintenance. It integrates all subordinate echelons within a theater into a single, centrally controlled, system capable of both peacetime and wartime operations. The advantages of SAAS are many, as shown below:

1. Standardizes ammunition management procedures.
2. Improves asset visibility.
3. Provides intransit visibility.
4. Provides more accurate and timely reports to the US Army Armament Command and the US Army Missile Command.
5. Standardized training given to ammunition manager.
6. Replaces three command unique level 3 systems.

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<sup>7</sup> MFR, ATCL-R, Proceedings of the Sixth Meeting of the US Army Logistics Center Advisory Group (LOGCAB), 19-20 October 1976, US Army Logistics Center, p. 2-23.



In August 1972, the Department of the Army approved the USARPAC Central Munition System (CMS) as the operating system baseline and the worldwide Ammunition Reporting System (WARS) as the reporting system baseline for SAAS.

Rather than attempting to identify similar tasks performed by organizations or activities which may not be the same in each command, SAAS planners use the term "levels" to describe activities performing certain common functions. SAAS Level 1 provides theater level inventory and maintenance management for conventional ammunition and serves as the command link with the Army Materiel Development and Readiness Command. It consists of seven interlinking segments or subsystems which process supply and maintenance transactions and provide management reports, including the worldwide ammunition reports. Runs to update the data files occur daily, semimonthly, and monthly. Report cycles are semimonthly, monthly, quarterly, and as required. Level 1 users include theater army materiel management centers and major army command materiel management centers. Since July 1973, Level 1 has been operational at the 60th Ordnance Group, Zweibrueken, and the Central Ammunition Management Office, Pacific, at Fort Shafter, Hawaii. Level 2 was designed as a regional or command activity which would provide inventory management for a specific area of command. However, since Army doctrine pertaining to the echelons above division concept has eliminated the regional command structure, this Level was not developed. SAAS Level 3 operations exercise stock control over the assets of one or more storage sites. Users of this Level will include theater army area commands, corps support commands, support brigades, and installation supply activities. During 1976, this Level was in the development phase. When implemented, Level 3 will perform eight major functions, including the maintenance of catalog data, stock status, and serviceability information, and document status; the establishment of authorized levels; an ongoing comparison of assets to authorized levels (stratification); and the recording of the structure supported and the inventory status. Finally, Level 4 activities which will be implemented along with Level 1, will principally control custody over stocks to be distributed to other storage sites or to the user. This Level will be manual since its operators will not have access to a data processing facility. Ammunition supply points will be among the principal users of Level 4.<sup>8</sup>

On 13-16 August 1974, a change coordination conference was convened at Fort Lee to consider all System Change Requests submitted since the March 1974 conference and to reestablish priorities.<sup>9</sup> At the end of the

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<sup>8</sup>Fact Sheet, US Army Computer Systems Command, February 1978, subj: SAAS; Stanley D. Flaming, "Standard Army Ammunition System," Army Logistician, (Sep-Oct 1977), 6-7.

<sup>9</sup>For earlier developments in the history of SAAS, see the LOGC Annual Historical Summary, 1973-1974, pp. 96-97.



month, the coordination draft for TM 38-213-1 (TEST), SAAS functional user procedures, was distributed for field review. This manual was forwarded for printing and distribution at the end of the calendar year.

During 1975, a concept for the development of SAAS below the theater level was prepared by the Logistics Center and distributed for review and comment. These comments and critiques were carefully evaluated during the writing of the Draft General Functional System Requirements (GFSR) for SAAS Level 3, which was distributed for field review on 6 April 1976. Several changes were made in the draft in June as a result of evaluations from the field. On 12 September 1976, the GFSR was completed.

Milestones in the development and implementation of SAAS System Change Package are shown in the following chart:

System Change Package	SCRs Forwarded to USACSC	Broadcast Date	Installation Date	SCRs being Prepared in FY 77/T	Date of Implementa- tion & Change #
5	L06-R038-106 -115 -120 to 26	12 Sep 74			
6	L06-R038-127	Sep 74			
7	L06-N011-505 to 07	13 Nov 74			C1, 1 Apr 75
8	L06-C001-003 R038-125 N011-509	10 Apr 75			
9	L06-R038-117 -118 -131	Dec 75	Dec 75 (Zwei- brueken & Hawaii)		C3, Oct 75
10	L06-R038-135	Jul 76			C4, May 76
11				L06-R038-134 -116 -129	

Department of the Army Movements Management System (DAMMS). In response to a tasking from the Department of the Army, the General Development Plan for the theater movements management system was completed and forwarded to DA ODCSLOG on 11 March 1976. This plan presented a summary

description of the transportation and movement management requirements within the theater, how these requirements were being met, and the actions still needed to eliminate deficiencies. Additionally, it outlined the approach to be employed in the development of ADP supported procedures to facilitate movement management within the theater. The DA ODCSLOG approved this plan on 12 May and requested the Logistics Center to execute the Development and Management Plan for DAMMS. This plan was completed and forwarded to the Office of the Deputy Chief of Staff for Logistics on 24 June 1976. It established milestones and target dates for modular system development of DAMMS.

On 27 April 1976, the Logistics Center tasked the Transportation School to develop the GFSR for the Movements Programming Module, one of the five modules of the DAMMS. Additionally, the LOGC requested that a control plan be submitted which would outline the methodology for accomplishing the GFSR. The Transportation School completed and forwarded this control plan to the Logistics Center on 9 June 1976. The plan provided summary descriptions of movements programming requirements, objectives, and target milestone dates for GFSR development.

One part of the DAMMS is the Visibility of Intransit Cargo (VIC) system, an automated transportation logistics system which will provide visibility for all cargo flowing into, within, and out of the theater. The system will provide management feedback for all cargo in the theater portion of the transportation pipeline. VIC is being developed in four phases; phase I for import cargo, phase IA for container applications, phase II for intratheater cargo, and phase III for export cargo movement. VIC-I is being developed initially as a European-unique subsystem with USAREUR DCSLOG as the proponent and the 4th Transportation Brigade as the functional design agency. The VIC-I Project Master Plan was approved on 13 April 1976. The Computer Systems Command Support Group Europe thereafter worked on designing and programming VIC-I. The date established to implement the project was 1 February 1977. The Logistics Center VIC Functional Development Team completed the SCR for VIC Phase II and Phase III. The VIC Phase I DFSR and SCR were forwarded to appropriate MACOMs on 30 March 1976 for review and concurrences. An IPR to finalize changes to the SCR was hosted by USAREUR during the period 25-30 April 1976. Concurrences to the SCR, as amended during the IPR, were received from all MACOMs. By the end of FY 77/T, the Logistics Center VIC Functional Development Team was completing the SCR and the Economic Analysis prior to submission for approval by the Department of the Army, thus preparing the way for VIC to be declared the DA standard segment of the cargo module of the DAMMS.

Department of Army Standard Port System (DASPS). DASPS was developed as an automatic data processing system to meet the operating and management requirements of US Army overseas water terminals. The system was first installed at the BENELUX Army Terminal at Rotterdam in April 1974 and,

two months later, at the Bremerhaven Terminal. In July of that year, USARPAC operations at the ports of Yokohama, Naha, and Pusan were converted to DASPS. Thus, by FY 76, five major US Army overseas terminals had been given a firm foundation for the development of future transportation management systems. The DASPS is based on Department of Army guidance established by the Integrated Transportation Management System Study and DOD Regulation 4500.32R. It has been designed to operate in differing and ever-changing environments.

In April 1976, the Transportation School was tasked to develop the Contractor Payment Module DFSR for the Standard Port System. At the beginning of that same month, SCP L16-02-00 was implemented, and a Systems Change Request Review ("SCRUB") was conducted for SCP L16-04-00 and SCP L16-05-00. The functional validation of SCP L16-03-00 was completed in June, prior to its Field Validation Test (FVT) and broadcast schedule, set for July and 2 August respectively. Meanwhile, systems maintenance requirements continued to be supported; i.e., the review and evaluation of SCRs and proposed regulatory changes.

Standard Property Book System (SPBS). This is an automated multi-command system which is being developed to provide a means of centralizing property book accounting and asset visibility. The system will automatically generate asset reports required by the United States Army Major Item Data Agency (USAMIDA) through a link with the Asset Control System (ACS), thereby providing local commanders and managers with necessary property book asset management data. The system will ultimately be expanded to include the unique requirements of the Health Services Command and hospitals.

Development of the SPBS was initiated in October 1973, based on guidance provided by the SAILS Functional Guidance Group (SFGG) and DFCR 4-1-070, 21 June 1973. The DFCR established a requirement for a property book system which would mesh with the SAILS supply system and provide asset visibility to the national level. During the period from 15 January to 26 July 1974, user procedures were developed, functional guidance was provided to the USACSC Support Group at Fort Hood, and a functional evaluation test of the system was completed by LOGC representatives comprising the PBS development team.

During development, the system was expanded to be virtually stand-alone, capable of functioning in any Army-wide environment (installation, corps, division, or separate brigade) regardless of whether the SAILS supply system was present or not, and to provide automated centralized property book support and/or total asset visibility of supported property book accounts. After the system was redesigned to stand alone, the Logistics Center submitted a recommendation through Headquarters TRADOC to the Department of the Army, 26 September 1974, to change the system

title from SAILS Property Book Subsystem to the Standard Property Book System. This recommendation was approved by DA letter, DALO-PLS, 3 December 1974, subject: Standard Property Book System.

During FY 75/3 work continued on the administrative development of the SPBS with a rewriter and update of the draft Functional User Procedures. A Level 3 Systems Environment Test (SET) by the USACSC and the Logistics Center in June 1975 validated 10 SCRs. A Functional Application Test (FAT) was done at Fort Leavenworth the following November. The DCT Level Three test was completed on 16 April 1976 with the signing of the ADP Modification Order which validated 16 functional System Change Requests.

The Economic Analysis and Draft User Manual TM 38-755 (TEST) for SPBS were forwarded to HQDA on 4 May and 11 May 1976, respectively, for final review. An IPR, conducted on 4 June 1976, resulted in several conclusions. It was, first of all, determined that the Systems Integration Test should be completed by 2 August 1976. The Prototype Evaluation Test (PET) site was changed from Fort Leavenworth to Fort Carson, and the following milestone dates were accepted by the IPR participants:

- a. 30 August 1976--begin functional training.
- b. 7 September 1976--start conversion from manual property books to the automated files.
- c. Once fifty percent of the supported activities have been converted to the automated files, the official PET will begin.

IPR participants also agreed that Department of the Army Headquarters should invite all MACOMs and interested agencies to participate in the PET.

Mechanization of DSU/GSU Supply Operations (NCR 500) System. A Logistics Center supply representative provided functional and technical assistance during the installation of the NCR 500 System in the 777th Maintenance Company, Tennessee National Guard, during the period 19 April-20 May 1976. This was the first time that the Logistics Center participated in the installation of the NCR 500 System since the LOGC assumed this mission from the USACSC on 1 July 1975. At the end of FY 76, a second extension had been approved by Department of the Army Headquarters and the Army National Guard Bureau for installation in the 158th S&S Bn, Arizona National Guard. This installation was scheduled to be on or about 1 November 1976. The NCR 500 System was operational in approximately 90 active Army and Reserve component units worldwide by the end of FY 76. The Direct Support Unit Standard Supply System (DS4) will eventually replace the NCR 500 System.



## VIII

### INDIVIDUAL TRAINING AND EDUCATION

#### Personnel Management Systems

Officer Personnel Management System. In a TRADOC report on the Education of Army Officers, published in March 1975, various challenges were noted which required the redesign of the Army officer education and training system. These were challenges, however, not only to officer education and training, but to the education and training of every soldier. Indeed, they form the underlying rationale for the restructured Army educational system and, thus, are quoted in full:<sup>1</sup>

1. The Army is faced with the prospect of relatively fewer dollars and cutbacks on manpower and facilities. It will have to do more training with less resources.
2. The technical environment in which future battles will be fought is being altered significantly by the introduction of new means of developing firepower, of gathering intelligence, of communicating, and of moving about on the battlefield.
3. Throughout the world there has been a proliferation of modern weapons of great lethality; almost any future war threatens unprecedented intensity. The US military must anticipate fighting outnumbered by [sic] weapons systems comparable to its own.
4. Given the tensions among nations possessing large quantities of lethal weapons systems, the next war could be a brief, sharp struggle resulting in rapid political realignments to end the fighting. This means that the military outcome will depend on the results of the first battles. The Army must be prepared to win those battles -- ready to fight as it exists, without reliance on a lengthy general mobilization. This includes greater utilization of the Reserve Components in the context of the Total Force Policy.

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<sup>1</sup>Education of Army Officers Under The Officer Personnel Management System: Report of the TRADOC OPMS Task Group (2 volumes), 14 March 1975, II, II-1.

The education of the officer, it was decided, should be marked by:<sup>2</sup>

1. Focus on fundamental skills to the exclusion of "nice to know" material in the limited resident training time available.
2. Use of resident training to prepare officers specifically for their next immediate assignment.
3. Greater emphasis on providing training programs to the field in order to support the individual developmental training of officers, and to assist officers in the collective training of their units in the tactics and techniques essential to combat effectiveness.

It was the purpose of the Officer Personnel Management System (OPMS) to insure the development and implementation of the above aims. From its very inception, the Logistics Center was actively involved in the development of the OPMS. General Graham wrote the Secretary of the Army in August 1974, "We completely recognize and appreciate the importance of the officer career management and development system . . . and I have directed the reorientation of our training and education effort to be in consonance with it. Be assured that the officers of the Logistics Center are well aware of the important provisions of OPMS."<sup>3</sup> By the summer of 1974, the Logistics Center had already initiated many actions in support of the OPMS. It had reviewed and commented on draft DA Pamphlet 600-3, Officer Professional Development and Utilization. Logistics career development patterns had been developed and refined in coordination with LOGC associated schools and a comprehensive package of recommended changes to existing OPMS programs had been submitted to TRADOC Headquarters. The Logistics Center had conducted a conference and given several briefings on OPMS. It had evaluated the current basic and advanced officer course curricula of Army service schools and had developed a core curriculum of logistics subjects, and it continued to work on developing OPMS courses which would offer the best training while reducing costs.<sup>4</sup>

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<sup>2</sup>Ibid., II, II-1-2.

<sup>3</sup>Ltr, ATCL-TE, MG Erwin M. Graham, Jr. to the Honorable Howard H. Callaway, Secretary of the Army, 29 August 1974.

<sup>4</sup>Inclosure one to ibid.

One of the first major undertakings initiated in the development of the OPMS was Project EASI (Expanded Additional Skill Identifiers). Begun in early 1973, this project was "the interim method used for identifying specialty requirements associated with each officer duty position"<sup>5</sup> and would, consequently, serve as a basis for the formulation of career development under the Officer Personnel Management System. During 1974-75, the Logistics Center Training and Education Directorate accumulated and validated career development actions for the 20 logistics specialties with special emphasis on the Armament, Tank-Ground Mobility, Construction (Engineer), and Communications-Electronics Materiel Management Specialties. On 4 November 1974, LOGC personnel attended a meeting of the DA OPMS Steering Committee. At that time, the logistics specialty of Construction and Marine Materiel Management was eliminated as a separate specialty. Construction Materiel and Marine Materiel were transferred as skills within the specialties of Tank/Ground Materiel Management and Marine and Terminal Operations, respectively.

The Logistics Center was represented at another meeting of the DA OPMS Steering Committee on 20 December 1974. It was decided at this meeting that new accessions (Second Lieutenants) to the Construction Materiel skill will be Ordnance officers, and these officers' careers will be managed by the Ordnance Branch, OPD, MILPERCEN. It was also decided that new accessions to the C-E Materiel Specialty will be Signal officers who will be managed by the Signal Branch, OPD, MILPERCEN.

During the winter of 1975, the Training and Education Directorate reviewed the proposed education methodologies for the OPMS basic entry logistics specialties which had been submitted by the respective LOGC associated schools. The US Army Signal School education methodology for the specialty of Communications-Electronics Materiel Management was also received and reviewed. A letter containing LOGC comments on this proposal was forwarded to the Commandant, USA Signal School, on 24 February 1975. On 10 May 1975, the Logistics Center prepared a position regarding the education methodologies proposed by the associated schools. The LOGC recommended that the Tank and Ground Mobility Materiel Management Specialty be subdivided into the subspecialties of:

1. Tank and Ground Mobility Materiel, General.
2. Tank-Automotive Materiel.

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<sup>5</sup>MFR, DAPC-EPZ-H, COL William L. Hauser, Chief of the EPMS Task Force, to Members, EPMS Task Force, 1 September 1975, subj: Analytical Methodology and Professional Goals.

3. Ground Support Materiel.

4. Motor Officer.

It was further recommended that ROTC cadets trained as parachutists and aviators be utilized in the General Troop Support Materiel and Aviation Materiel specialties, respectively. Finally, the Logistics Center advanced the idea of a Logistics Officer Advanced Course (LOAC).

Towards the end of 1975, a study on the feasibility of initiating a Logistics Officer Advanced Course was completed. A study, subject: Report of the Study of Logistics Training in Advanced Entry Specialties, was forwarded to TRADOC on 11 November 1975, after being approved by General Vuley. The recommendations included:

1. That captains be trained at ALMC in logistics advanced entry specialties under a combination of Option 3 (8 weeks or less TDY immediately after the branch advanced course) and Option 4 (8 weeks or less TDY two or three years after the branch advanced course).
2. That ALMC be requested to begin preparation, in coordination with the LOGC, of Programs of Instruction for advanced entry specialty training in Procurement and Research and Development.
3. That proponent schools be directed to develop instructional packets on the alternate specialties for orientation during branch officer advanced courses.
4. That instruction in intermediate logistics management, particularly the functions of the FASCO, be incorporated into branch advanced courses consistent with available resources.
5. That MILPERCEN be requested to forecast and program requirements for captains in the logistics advanced entry specialties as accurately as practicable.

However, it was determined that a Logistics Officer Advanced Course was not feasible at that time, and the term was discontinued. By letter, ATTN:G-OPMS, of 18 November 1975, signed by MG Gorman, TRADOC approved these study recommendations. It was suggested that development of alternate specialty orientation packets be delayed until revision of DA PAM 600-3 in July 1976.

Enlisted Personnel Management System. Actions to upgrade the career management program for enlisted soldiers began even earlier than those for the officers' program. In 1968, the Secretary of Defense directed the armed services to develop enlisted manpower and personnel



management system. As explained to the Chief of Staff, career progression would be analyzed in each CMF; grade authorizations would be revised to provide for equitable promotion opportunity in each CMF and MOS. At the same time, the training system (including AIT, Basic NCOES, and Advanced NCOES) and the MOS evaluation system would be tied into the system of grade progression. The soldier's career would be viewed as a series of achievement levels, his upward progress being determined by successful completion of training and by mastery of professional skills. Since it was determined during work on the Enlisted Force Management Plan that the current system of grades and MOS skill levels did not permit effective assignment management and career planning, a new standardized relationship of grades and skill levels was recommended. This new relationship was included in the Enlisted Force Management Plan submitted to OSD. The Chief of Staff approved the overall EPMS concept and directed the EPMS Task Force, which was about to be formed, to involve Army commands and other elements of the Army Staff in the project. In particular, he directed that the US Army Training and Doctrine Command be involved.<sup>6</sup>

On 23 August 1974, a decision briefing on EPMS was presented to General Weyand, The Vice Chief of Staff of the Army, by the EPMS Task Force. The Task Force made recommendations concerning skill levels, grade structure and authorizations, MOS progression patterns, the promotion system, leadership and skill training, and skill evaluations. The Vice Chief approved all recommendations and also gave additional guidance. He directed that, in studying SP5 and SP6 grades in other career fields, specialist grades should be eliminated in favor of NCO grades wherever reasonable. He also stressed that an effort should be made to keep terminology simple, so that it can be more easily understood throughout the Army. EPMS, he indicated, should not be rushed any faster than established by the Implementation Schedule, but it should not go any slower either: "The system needs to be pushed." Finally, he emphasized that a good command information program, including education of the officer corps, is essential to the successful implementation of the EPMS.<sup>7</sup>

The Department of the Army Military Personnel Center had the responsibility to redesign the enlisted Career Management Fields. The redesign effort was oriented toward eliminating low density MOSs, consolidating

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<sup>6</sup> Ibid.

<sup>7</sup> MFR, DAPE-MPE-SS, MG George W. Putnam, Jr., Director of Military Personnel Management, 23 August 1974, subj: Decision Briefing on the Enlisted Personnel Management System (EPMS) for the VCSA.

management systems in sufficient detail to permit manpower and cost analysis by his office. The Army responded to this requirement by conducting a number of studies, principally the 1969 Enlisted Grade Structure Study. Also, during 1968-72, the Army developed a number of new personnel management programs including: Career Management Fields (CMFs), centralized and semicentralized promotion systems, Qualitative Management Programs (QMPs), reenlistment controls, reclassification controls, Enlisted Evaluation System (EES), and the Noncommissioned Officer Education System (NCOES). In short, the Army built a number of excellent management programs but, under the pressures of the Vietnam War, was not able to construct an integrated overall career management system for enlisted soldiers. To remedy this shortcoming, which was felt with increasing keenness once the draft was eliminated, the Director of Military Personnel Management (ODCSPER) and the MILPERCEN Commander agreed in January 1973 that the Army should construct an EPMS (Enlisted Personnel Management System) as comprehensive as the OPMS already under development.

The following month, the Office of the Secretary of Defense (OSD) notified the armed services that, since the Vietnam War was winding down, the time had come to finish the designing of comprehensive enlisted manpower/personnel systems. The Air Force had been the only service whose system, developed during 1968-72, had met OSD standards. The other services had to fashion similar systems by the end of FY 73, in four months time. OSD requirements included:

1. Plan of management by year-group, grade, and skill.
2. Increased emphasis on personnel management factors (e.g., job progression, promotion opportunity, reasonable balance between grade authorizations and assets) rather than TOE and TDA requirements, in determining grade structure.
3. Description of an objective enlisted force, expressed numerically in sufficient detail to permit manpower and cost analysis.
4. Description of the management system by which the objective force will be achieved and maintained.

An ad hoc working group was formed by ODCSPER and MILPERCEN in March 1973, which developed a number of new ideas, some of which were incorporated into the EPMS project. On 14 June 1973, this group submitted to the Army Chief of Staff an overall concept for the EPMS. Generally, what was proposed was an integration of the training, evaluation, classification, and promotion subsystems of the enlisted personnel

MOSs that have similar tasks and require similar skills, and providing equitable promotion opportunities to all enlisted personnel. The Logistics Center participated in the evaluation of redesigned logistics CMFs and acted as a coordinating agency between TRADOC Headquarters and the four LOGC associated schools. Evaluation within the Logistics Center consisted of reviews to insure that maintenance of all equipment was assigned to a logical MOS, to evaluate impact on materiel requirements, to alter MACRIT and Annual Maintenance Man-Hours, and to determine the impact of proposed changes on reserve components and logistical concepts.

The LOGC review of CMFs began as early as 10 September 1973, when the Training and Education Directorate began its review of CMF 63, Mechanical Maintenance. Eventually, the CMFs were divided into six different groups, according to the projected implementation date. The Logistics Center had the responsibility to review 10 CMFs, including at least 1 from each group. The schedule for implementation of CMFs reviewed by the Logistics Center is shown in the following table:

<u>CMF Number</u>	<u>CMF Description</u>	<u>Group</u>	<u>Group Implementation Date</u>
63	Mech Maintenance	I	1 October 1975
55	Ammo	II	1 April 1976
64	Transportation	II	1 April 1976
76	Supply	II	1 April 1976
92	Petroleum	III	1 October 1976
94	Food Service	III	1 October 1976
54	Chemical	V	1 April 1977
67	Aviation Maintenance	IV	1 April 1977
27	Combat Missile Main	V	1 October 1977
23	ADA Missile Main	VI	1 April 1978

As a result of an analysis conducted during the redesign of CMF 51 (General Engineering) and CMF 52 (Power Production), the US Army Engineer School (USAES) recommended that organizational maintenance of power generators be transferred to one of the MOSs in CMF 63 (Mechanical Maintenance). The Ordnance Center and School was the proponent for CMF 63. Several conferences were conducted in which representatives from the Engineer and Logistics Schools, the Logistics Center, and TRADOC participated. The first of these conferences was held in September 1975.

The conference participants agreed that the responsibility for the organization maintenance of power generation equipment be assigned to the Wheel Vehicle Mechanic, MOS 63B. This would increase training time by two weeks at the Army Training Centers, but it would have no effect

on the number of mechanics in the unit motor pool. Cost analysis showed that the transfer was economically feasible, and a formal proposal to make the change was sent to TRADOC May 1976. At the end of FY 76, TRADOC was completing the selection of training sites and refining the new program of instruction. Meanwhile, the Logistics Center, DARCOM, the Engineer School, and the Ordnance Center and School reviewed Maintenance Allocation Charts to insure compatibility.

It is expected that several benefits will be realized from the transfer of responsibilities for organization maintenance of power generation equipment. It will, first of all, increase utilization and efficiency in unit maintenance operations. Secondly, it will save approximately four million dollars. Finally, MOS 52B, Power Generation Equipment Operator/Mechanic will be eliminated, an MOS which provided few incentives and reduced promotion potential for incumbents when compared to other MOSs.

On 14 August 1975, the Training and Education Directorate recommended to the Logistics Center Command Group that the Center participate in the development, design, and testing of soldiers manuals and SQTs. This recommendation was approved; and, on 1 October, a project was initiated to identify necessary design and implementation efforts for the EPMS. The project was concerned with the development of EPMS implementation documents, guidance to LOGC associated schools, and the review and staffing of documents prior to submission to TRADOC. Career Management Field implementation schedules pertaining to LOGC associated schools were identified and reviewed. Also, it was determined which EPMS documents should be reviewed and what the reviews should cover. Manpower requirements were carefully analyzed.

On 10 October 1975, TRADOC Headquarters approved a LOGC request to have all EPMS tasking for Logistics Center associated schools directed through the LOGC. In the next few months, TRADOC initiated several actions concerning the EPMS. On 23 October, it published formal guidance on many individual EPMS areas. EPMS milestones were revised and published on 13 November; further revisions were made and published on 10 December. TRADOC published initial SQT validations procedures on 19 November 1975. Also, a draft circular for Individual Training Programs (ITP) was published in November. Publication and distribution of the final circular occurred at the beginning of 1976.<sup>8</sup> At the same time, the first of the draft soldiers manuals started to flow from proponent

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<sup>8</sup> Fact Sheet, ATCL-TP, CPT Utecht, 19 December 1975, subj: Enlisted Personnel Management System (EPMS).



schools, and this required numerous trips to the associated schools and to TRADOC in order to coordinate matters properly. In some cases, the review of the soldiers manuals was made right at the proponent school because of the pressure of rapidly approaching submission deadlines.

During FY 76, the Military Personnel Center continued action to redesign the enlisted Career Management Fields. The Logistics Center participated in the evaluation and coordination of 16 separate CMFs consisting of almost 200 MOSs. By the end of FY 76, only 2 CMFs remained to be evaluated, CMF 23 (Air Defense Missile Maintenance) and CMF 29 (Communications-Electronics Maintenance). CMF 29 was basically the responsibility of the Signal School; however, the Logistics Center also entered into the review process. Two other CMFs were in the final editorial stages prior to implementation. The Career Management Fields which have been redesigned provide viable career patterns for enlisted personnel. The improvement in promotion opportunity, job satisfaction, and increased job efficiency should increase; however, total impact cannot be assessed until complete implementation of all redesigned CMFs in late 1978.

#### Improving Training Effectiveness

Is improved training a realistic alternative to investments in improved materiel? Can weapon systems effectiveness be raised by training up to the innate potential of the materiel? . . . there is solid evidence in history that, for some weapon systems, the answer is a strong "yes."<sup>9</sup>

One of the basic lessons to be learned from studying military history is that the effectiveness of military equipment is directly proportional to the training of the soldiers who are using it. Given more or less similar combat arms on both sides of the battlefield, the army with the superior training will win the engagement. This was true for Caesar's Roman Legions, Frederick Barbarossa's archers, Napoleon's Army of the Republic, the fleet of the British Empire, and the Israeli Army, and it will no doubt continue as an axiom of military science. Yet, the US Army has been woefully negligent in appreciating the implications of this dictate. The United States has always been able to enter a war in a disadvantageous position and yet, by utilizing its population, natural resources, and industrial strength, have a huge military machine by war's end. The training itself was done mainly during the war.

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<sup>9</sup> TRADOC Pam 71-8, Analyzing Training Effectiveness, 10 February 1976, p. I-4.

However, it has become a basic tenet of today's Army that we must be prepared to win the first battle of the next war, and a way must be found in peacetime to insure that victory. This means that peacetime training must be emphasized. We cannot expect materiel developments alone to guarantee military superiority, for, in an age when each defense dollar must be used as effectively as possible, it seems unlikely that either the Soviet Union or the United States will gain a decided materiel advantage. Training is what has given the Israeli army the edge against the Arab nations, and training must likewise give the United States the extra leverage to win the first battle of the next war. In the last several years TRADOC has initiated several programs to give the US Army that leverage.

Improved Technical Documentation and Training (ITDT). ITDT was a program begun in May 1975 through the joint efforts of TRADOC and the Army Materiel Command. Its purpose was to upgrade Army training by improving technical documentation--including training manuals--and training courses and then combining both into a composite package. Training programs and literature were to be developed at the same time as new equipment, and modern educational techniques were to be used to prepare well-illustrated, easily understandable, training documents.<sup>10</sup>

Within the Logistics Center, proponentcy for ITDT was transferred from the Materiel to the Training and Education Directorate on 8 October 1975. The Logistics Center was tasked by the joint AMC-TRADOC steering committee on 26 August 1975 to provide a list of materiel systems and associated MOSSs, arranged according to priorities, as candidates for ITDT demonstration projects. This list was furnished TRADOC Headquarters on 31 October 1975. A working committee met at Lexington, Kentucky, on 11-12 November 1975 to review the list prepared by the Logistics Center. The following demonstration systems were selected for recommendation to the steering committee: XM1 Tank, Battery Computer System (TACFIRE), Mortar Locating Radar AN/TPQ 36 (possible candidate), Tank Turret System/MOS 45, Wheel Vehicle Systems/MOS 63B, and the Tracked Vehicle System/MOS 63C. It was decided that the draft specifications developed by Kinto and the ITDT Task Force would be used for the selected demonstration projects.

On 24-26 November 1975, the working committee met at Ft Eustis, Virginia, to implement the proposed action plan for the ITDT demonstration project "Tank Turret System" and to review the LOGC Wheel Vehicle nominations and the sufficiency of the Kinton ITDT draft specifications. On the third day of the meeting, it was decided to scrap the planned contract

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<sup>10</sup> See the article by LTC Ross S. Buchan, Australian Army, and MAJ Ray Knutson, USA, "The Army Departs from Training Tradition," Defense Management Journal (January 1977), 33-37.

milestones. The committee was advised that anticipated budget constraints made it imperative that contracts for the demonstration projects be let by the end of the fiscal year. This necessitated a compressed procurement action and limited the fielded system demonstration projects to the tank turret and the wheel vehicle systems. A contractual milestone schedule was developed for both projects to comply with the 30 June deadline, the end of the fiscal year. The Army Materiel Command committed three million dollars and TRADOC earmarked 1.3 million dollars for the demonstration projects.

Contracts for both demonstration projects were let. The tank turret project successful bidder was the Hughes Aircraft Company for the sum of 1.3 million dollars. The contract included the Job Performance Manuals (JPM), Job Performance Guides (JPG), Extension Training Materials (ETM), and instructional materials for self-pacing of resident tank turret mechanic course for the following tank turrets and MOS:

1. M60, M60A1, M60A2, M551, M551A1, M728.
2. 45K, N, P, R; 41C, 34G; 11D, 11E.

The wheeled vehicle project successful bidder was Data Communications, Inc., for the sum of 1.1 million dollars. The contract included the JPM, MPG, and ETM for the following trucks and MOSs:

1. 2 1/2 ton truck M35; 5 ton truck M800.
2. 63B, 63G, 63H.

On 11 December 1975, Major General Gorman forwarded a letter to General Graham citing the need for improved technical manuals and requesting the support and the cooperation of the Logistics Center in this area. The Logistics Center responded by noting the Center's involvement with ITDT since the program was begun. Future support and cooperation was assured. The Logistics Center further recommended that initially the ITDT demonstration projects be limited to those projects nominated by the ITDT working committee. This will insure that the projects produce a significant value gain over traditional TM concepts.

Training Effectiveness Analysis (TEA). TEA is designed to improve training effectiveness. General DePuy, by personal letter, dated 4 February 1975, directed the TRADOC school commandants to analyze the training effectiveness of materiel, equipment, and weapon systems for which they were the proponent. He also forwarded a draft Operations Research Methodology Paper (later published as TRADOC Pam 71-8, Analyzing Training Effectiveness) which provided standard guidelines for the analysis of training; i.e., identify training systems weaknesses,

analyze the problem, develop alternative training techniques, and discover how to support and train despite limited resources. His letter was sent directly to the school commandants of the four LOGC associated schools; the Logistics Center did not receive an information copy.

On 18 June 1975, TRADOC directed the schools to forward their DD Forms 1498 (Research and Technology Work Summary Forms), initiated as a result of General DePuy's 4 February letter, directly to their appropriate integrating center. The four Logistics Center associated schools submitted a total of thirteen studies, which were sent directly to TRADOC Headquarters without LOGC staffing or directorate action. However, these studies were later sent to the Logistics Center for review and coordination. In addition, three in-house studies were initiated by the Center. The studies and the proponent agencies were as follows:

Missile and Munitions Center and School

- Restructuring of Missile System Repair MOS
- Theoretical Troubleshooting by CAI Simulation (study disapproved by TRADOC)

Quartermaster School

- Supply Effectiveness in Mechanized Stock Control in Divisional DSU
- The 5,000 Pound Parachute Release Assembly (study completed 1 October 1976)

Ordnance and Chemical Center and School

- Analysis of Preventive Maintenance Training
- Determination of Repair Proficiency
- Malfunction Diagnosis Training
- Training in On-Site Maintenance (completed 1 July 1976)
- Readiness Training for Individual Survival and Basic Operating Standards for NBC Defense\*
- Training for Unit NBC Defense Teams\*
- Unit NBC Defense Training\*

Transportation School

- Transportation Training Analysis (terminated in March 1976 by Transportation School)
- Training for Heavy Truck Drivers (completed 18 August 1976)

Logistics Center

- Logistics Simulation Models for Training (Phase II of LOTS, Logistics Over the Shore Operations)
- Improved Training Support for Early Deploying Logistics Units
- Logistics Simulation Models for Training

\*Since these studies dealt with NBC areas, they were forwarded to the Combined Arms Center to be monitored there.



TRADOC directed on 11 December 1975 that training development studies be included along with combat development studies in the TRADOC study program. Also, the schools' combat development elements were to coordinate and assist the training development elements in the preparation and staffing of studies and requests for contract support. The message outlined guidance for the schools and integrating centers to use when reviewing and revising the FY 76-7T Study Program pending revision of Army and TRADOC regulations. As a result of General DePuy's concern with the effectiveness of school training, the TRADOC school model (Model 76) was developed. The model reorganized TRADOC schools into directorates for support, combat developments, training development, and evaluation and training. The Evaluation Directorate may be the single most important element in the reorganized schools, for this Directorate determines the effectiveness of training and provides the information which provides the basis for improvements to the system.

Within the Logistics Center, an internal procedure was established to provide improved control over the training analysis done by the associated schools. Overall management rested with the Office of the Deputy Chief of Staff for Operations (Program Evaluation Branch). The Training and Education Directorate was given the responsibility for determining training implications and for reviewing the technological integrity of the school analyses.

Technical Inspection/Quality Control (TI/QC). One of the Logistics Center's Major Program Objectives has been to improve force readiness through the development of a TI/QC program. During 1974-76, three main projects were underway in support of this MPO: the Maintenance Quality Specialist (MQS) program, the TI/QC study, and the development of TI/QC procedures.

The Maintenance Quality Specialists program was initiated and designed by the Logistics Center in coordination with DARCOM. The objective was to develop a program for utilizing Department of Army civilians to provide advice and assistance to commanders and other maintenance personnel in order to improve unit and materiel readiness at the maintenance battalion level. Areas of assistance considered were quality assurance/control, technical inspection, repair parts supply, shop layout, and production control. On 2 July 1975, DARCOM agreed to join TRADOC in a mutual development effort by sharing the cost and personnel spaces to conduct an evaluation of the concept through a pilot test in CONUS and Europe. The program was forwarded to TRADOC on 4 November 1975 for approval. The pilot program was scheduled to begin in April 1976 with the training of program participants; however, the delay of TRADOC approval of the concept until 23 April 1976 and lack of resources delayed the program until FY 77/78. A Memorandum of Agreement was prepared by the LOGC in coordination with DARCOM for conduct of the

pilot program as a joint DARCOM/TRADOC effort, with manpower and funding resources to be equally shared by the two commands. However, as of the summer of 1976, this agreement had not yet been signed by DARCOM. The LOGC was concerned by the delay at DARCOM caused by internal problems in the delegation of staff responsibility resulting from a major DARCOM reorganization that disestablished the staff element previously charged. The problem has not yet been resolved at the end of FY 76.

The Concepts and Doctrine Directorate was responsible for the TI/QC study. The study was conducted by the US Army Ordnance Center and School to determine TI/QC requirements in DS/GS units and identify changes, resources, training and other related actions to implement a meaningful TI/QC program. By the end of FY 76, a coordination draft had been reviewed and comments supplied to the OCC&S. The COEA submitted by the contractor was inadequate, and was finally completed in-house by the OCC&S. The final study was to be completed and the Logistics Center briefed on the findings by October 1976.

The TI/QC procedures were to be developed by the Materiel Directorate. The plan was to provide quality oriented manuals for supervisory and operational areas at the direct and general support levels. A need was detected for a "How To" manual with information on quality programs and inspection which would include standards for a planning guide in establishing internal shop procedures. Initial efforts in 1975 at the MMCS in developing criteria for field units to determine hardware condition and control workmanship quality were found to have limited value. These attempts to develop TI/QC procedures for direct and general support maintenance were basically unsuccessful because of a lack of rejection criteria. Depot quality control operations at Anniston and Letterkenny Army Depots were examined. These proved to be more beneficial as a source for rejection criteria, and DARCOM agreed to task Anniston Army Depot for assistance. By the end of FY 76, the OCC&S was planning to work with Tobyhanna Army Depot to determine the extent to which procedures could be applied for the Army in the field.

Training to Support New Equipment. This project is designed to insure the integration of instruction on new equipment into the programs of instruction of Logistics Center associated schools. A major part of the project is to make certain that school-trained logistics support player personnel are available during OT III (OT II, where possible) of new equipment and systems. Another objective is to insure that sufficient school-trained logistics personnel are on hand to support new equipment once it has been fielded. As of the end of FY 76, fifty-one new items of equipment were scheduled to be considered during the next two years. The milestone schedules were based on input from the associated schools.

This project resulted from an important directive signed by General DePuy on 29 August 1975. In that order, General DePuy directed that:

1. OT will be conducted by tactical troops using production equipment (or production prototype) and TRADOC approved scenarios, tactics, techniques, logistic concepts, and doctrine.
2. Training for test "player/logistic" personnel will be conducted by the appropriate TRADOC school or center using the TRADOC approved training (operations and logistics) program to be implemented when the system is deployed.
3. The logistic support system tested will be identical to the system planned to support the tactical item when fully fielded.

General DePuy further stipulated that the Logistics Center as the TRADOC "Center of Excellence" for logistics matters be the primary agency to insure that the outlined policy is followed in the testing effort.<sup>11</sup>

As a result of General DePuy's guidance, the Logistics Center provided instructions, on 26 February 1976, on logistics training in support of OT III to its associated schools and to the Engineer and Signal Schools. Training support actions coordinated by the Logistics Center have been conducted for the following materiel systems for OT II/OT III DS/GS training requirements:

1. Baseline Army Reliability Test
2. Battlefield Assessment and Repair Techniques
3. Coaxial Machine Gun-MAG 58
4. COBRA/TOW
5. MICV
6. I HAWK
7. XM1 Tank
8. MIL HET
9. DRAGON (OT IIIA)
10. ROLAND
11. AN/TSQ 73
12. LCSS
13. ITV

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<sup>11</sup>General DePuy's letter is cited in the FY 1976 Training and Education Directorate historical feeder report.

14. AN/UAS-8
15. UH-1
16. MALOR
17. TACFIRE
18. ASA systems
19. Light Weight Company Mortar System

Training Extension Course (TEC) Training System. In the summer of 1974, TRADOC introduced a new course designed to improve the field commander's ability to deal with MOS training deficiencies worldwide, with an increased emphasis on the combat support and combat service support elements of Reserve Components. The Training Extension Course employed multimedia, prepacked, individualized and performance-oriented instruction materials, which included audio-visual and audio only programed texts.

Training Extension Course development was separated into two phases. In the first year, proponent schools selected MOSs for TEC, isolated tasks, nominated lessons, and prepared Governmental Furnished Materials (GFM) for contractor use. In the second year, lesson training "kits" were developed by a contractor in conjunction with the proponent school. A letter from TRADOC (ATTS-AS-P), 6 June 1974, directed the LOGC to assure the management of the TEC efforts of the LOGC associated schools. Funds were provided for the contractual development of 150 TEC lessons in FY 76. In August 1974, the LOGC associated schools identified the following TEC lessons for development:

LOGC School	Lesson Subject Area	NR Lessons
QM	Supply--Mess Mgt	50
ORD	Trouble Shooting	50
TC	Mvt Control Sp	25
M&M	Ammo Storage Sp	25

On 21 October 1974, the TRADOC DCST expanded the scope of the TEC program to support not only the individual soldier in an on-the-job setting, but also the individual soldier in an institutional setting. Specified guidance was provided for the development of TEC materials. Representatives of the LOGC associated schools and the LOGC were invited to a TRADOC conference on 13 November 1974 to justify those jobs selected by each school for TEC IV development. HQ, TRADOC on 14 November, approved TEC lessons nominated by the LOGC schools with the exception of the Transportation School's selection of Movement Control Specialist. On 4 December 1974, the Transportation School submitted additional justification and TRADOC Headquarters approved the Transportation School's selection for development under TEC.



The Field Artillery School, a TEC II school, had under contract development five lessons on ammunition which it requested in May 1974 that the Missile and Munitions Center and School (as proponent for ammunition) review for doctrinal efficiency. The MMCS informed the Field Artillery School on 19 June that the results were not favorable. The Field Artillery School, on 24 October 1974, again requested the MMCS to review the contractor's TEC lessons. However, the position of the Missile and Munitions Center and School remained unchanged; technical and doctrinal inaccuracies were still noted in the material which had been forwarded to it for reconsideration. Therefore, on 20 November, the MMCS recommended to the Field Artillery School that several TEC lessons on ammunition be withdrawn from the contractor due to these inaccuracies. It was suggested that such common lessons on ammunition as may be required be selected from those TEC lessons under development at the MMCS for MOS 55B20, Ammunition Storage Specialist. The Field Artillery School concurred in this recommendation on 3 February 1975.

The US Army Combat Arms Training Board (CATB), TEC administrative agent for HQ, TRADOC, forwarded two memoranda to HQ, TRADOC, on 6 and 11 December 1974, which noted the lack of manpower resources in some of the service schools for TEC lesson development and also the marginal criticality of some of the lessons nominated for development. The Board, consequently, recommended that three million dollars be cut from the FY 76 TEC budget and that some schools reduce the number of lessons under development and generally lessen their participation in the development of TEC packages. Specifically, it was recommended that the Transportation and Missile and Munitions Schools withdraw temporarily from the program and that the Ordnance and Quartermaster Schools reduce their number of lessons programmed from 50 to 25. On 18 October, the Logistics Center dispatched a message to TRADOC Headquarters recommending continued participation of LOGC associated schools in the TEC IV program, fully recognizing that this effort may have to be accomplished with reduced manpower. Two months later, a TRADOC TEC Review considered the impact of reduced manpower resources on TEC lesson development and by letter on 24 January 1975, TRADOC Headquarters reviewed the initial TEC IV FY 76 program. The revised program, as it impacted on LOGC associated schools provided for a compromised reduction in the number of TEC lessons to be developed in FY 76. The Transportation and Missile and Munitions Schools would each do 15, and the Ordnance and Quartermaster Schools would each do 25. The latter two were given additional personnel for TEC support. In general, the schools selected for FY 76 personnel support were those whose planned lesson development: (1) applied to the largest number of soldiers in the Active Army and Reserve Component units, (2) covered skills critical to mission accomplishment, (3) covered skills which were most difficult to teach in field units, and (4) were suitable for nonresident type instruction. All LOGC associated schools concurred in the reduction of TEC lessons and expressed a desire to continue in the program; however, the Transportation School concurrence

on 6 February 1975 cautioned that without personnel augmentation, the TEC IV milestone schedule may need to be slowed to a more workable pace in order to produce a quality program within current personnel assets and priorities.

The Transportation School's concern was well-founded, for on 21 February 1975, the TRADOC IG noted that the School had not met the 31 January milestone schedule because of both the slow response to the validation questionnaire from field units and the lack of personnel resources at the School. In reply, the Transportation School submitted a revised milestone schedule to TRADOC Headquarters on 28 March. The school was then approximately two months behind the original TEC IV milestone schedule, but the revised schedule calling for reducing this time to one month by 30 June 1975. When approval of the revision was delayed, the Transportation School, on 28 April 1975, withdrew from the FY 1976 TEC program. TRADOC, on 23 June 1975, requested the School to reconsider and continue the program. The number of TEC lessons, it was suggested, could be reduced and December, rather than July 1975, would be the target date for the first GFM to be provided to the contractor (all other LOGC associated schools completed their scheduled milestones).

On 19-23 May 1975, the Combat Arms Training Board hosted a TEC IV Bid Evaluation Conference. The purpose was to evaluate the submissions by contractors for the development of TEC IV materials by the associated schools. The CATB provided invitational orders for the representatives from the Logistics Center and LOGC associated schools. The conference was a crucial milestone as the evaluation process determined which contractor would be working with each of the LOGC associated schools in FY 76 to develop TEC lessons.

On 25 June 1975, the Logistics Center received a letter from the CATB providing that TEC lesson distribution to CS/CSS units begin in the third quarter, FY 76. The vital question was whether all CS/CSS units should receive all the "common" TEC lessons. Each LOGC associated school and the LOGC (for each TOE for which proponent) was requested to determine if the enumerated TEC lessons were required to be available at a unit of a given TOE, because they were to be frequently used or could be made available at a centralized borrowing facility since the lessons were only to be used periodically. The LOGC response on 3 July 1975 noted that the method of distribution would have to take into consideration that: (1) the specific location of units may have an impact on allocation of lessons; e.g., overseas Active Army units may be fragmented over several different areas, none of which may have learning centers, libraries, or other units to provide this service, and (2) a unit may be remote from its own headquarters but collocated with a headquarters that has TEC hardware and software.

and personnel. The overall direction for the study was placed in the hands of the TRADOC Deputy Chief of Staff for Training. The study, also known as T<sup>2</sup>S<sup>2</sup>, was General DePuy's initial effort in the establishment of what he called a systems approach in support of our weapons systems. His idea was that the Army must refocus its attention away from organization to weapons and, in considering the weapon, must consider the total system. Developers should work to "systematically man and support our systems."<sup>15</sup> By a thorough analysis of the roles and interactions of the tank hardware, training personnel, and logistics subsystems, it was hoped to obtain the tank's full combat potential.<sup>16</sup>

The initial TRADOC tasking to the Logistics Center came on 9 March 1976. The information requested, however, was not available at the LOGC. Consequently, the Materiel Directorate tasked the Armor and Ordnance Schools for the specified data.<sup>17</sup> On 11 March a briefing was held for General Graham on Project ACE, which was the LOGC program to provide input for the Total Tank System Study. Project ACE dealt mainly with the development of skill requirements and training for tank maintenance specialists. General Graham agreed that the Master Mechanic concept needed to be developed.<sup>18</sup> Five days later, more specific guidance for the Logistics Center came from MG S. L. McClellan, the TRADOC Deputy Chief of Staff for Personnel. General McClellan, acting on guidance from General DePuy, asked four major questions:

- a. What is the level of operational availability that can be expected under favorable conditions in an operational (current peacetime) environment?
- b. What is the level of operational availability that exists in operational units?
- c. What are the principal causes for the differences between "a" and "b" above?

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<sup>15</sup>Cited in the TRADOC Annual Historical Review, 1 July 1975 to 30 September 1976, p. 158 (CONFIDENTIAL - Info used is UNCLASSIFIED).

<sup>16</sup>Ibid.

<sup>17</sup>Note placed in Master Mechanic Program file.

<sup>18</sup>MFR, ATCL-TA, Glenn E. Boquist, 15 March 1976, subj: ACE Briefing for CG, 11 Mar 76.

On 1 October 1975, the Logistics Training Board assumed the LOGC responsibility for the development of the TEC packages. The following month, the TEC III contract of the Quartermaster School was extended to include TEC IV, and the Missile and Munitions School's TEC IV contract was awarded to American Analysis Corporation.

During the fall of 1975, FY 7T/77 TEC lesson nominations were reviewed and staffed to insure compatibility with EPMS and other established criteria. The Training and Education Directorate noted, "A review of LOGC associated school nominations and input to CATB reflects varying degrees of "real" justification for each schools [sic] selection. . . . The TEC justifications of the LOGC associated schools are difficult to match against the specific criteria established by the LOGC and CATB."<sup>12</sup> Nevertheless, on 15 November, the nominations were approved by the LOGC Deputy Commander with minor changes and forwarded to TRADOC. Subsequent adjustments resulted in final TRADOC approval for the development of 146 lessons. The TEC project officer attended the TEC III and IV Conferences. The purpose of the conferences was to discuss problems, develop proposed solutions, review the TEC V contract, and recommend changes for future contracts.

On 16 March 1976, the Logistics Center approved the reduction of the Missile and Munitions Center and School FY 7T/77 program from 35 to 23 lessons. The 12 lessons deferred related to ammunition maintenance. The deferment was necessary because tasks were not stabilized at the time. Also, at the request of the LOGC, the Transportation School revised the tasks to be covered by TEC lessons during the FY 76 and 7T/77 programs for MOS 71N. Tasks more pertinent to the wartime functions of the 71N were approved by the Logistics Center on 19 April 1976.

Doctrinal changes necessitated major revisions to all TEC PLL lessons. Requirements were determined by the Quartermaster School and corrections were initiated on 1 May 1976. All revisions were completed by the end of FY 76, and the lessons were undergoing reproduction on a priority basis. Also, the development of all TAMMS clerk lessons was completed, and 12 of 24 lessons had been reproduced.

Several other actions were conducted in support of the TEC program. Selected logisticians (COSCOM and DISCOM Commander Designees) were briefed on the purpose, use, and current status of the program. Coordination was established with IEA and the DA DCSLOG to provide more timely

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DF, ATCL-TA, LTC Cathrall to Director, Logistics Training Board, 14 November 1975, subj: Review of FY 7T/77 Training Extension Course (TEC) Nominations.



notification of pending procedural changes which impact on TEC lessons; all proposed changes will be staffed with the proponent school prior to implementation. Also, the TEC project officer continued to coordinate the TEC FY 77 front end analysis efforts of LOGC associated schools and to monitor the contract development and reproduction phases of the TEC III and IV programs.

Effective 14 May 1976, responsibilities for all TEC activities formerly managed by the CATB were transferred to the US Army Training Support Center, Training Programs Directorate, Fort Eustis, Virginia.

Integration of New Doctrine. One of the continuing functions of the Logistics Center during 1975-76 was insuring the proper and expeditious incorporation of approved new concepts and doctrine into school programs of instructions. During the doctrinal development phase, guidance is provided schools so that they can include the material in instruction presented on new or emerging logistics developments. Once new logistics doctrine is approved at the departmental level, action is taken to inform the schools so that revisions to course materials can be made and the old doctrinal concept replaced. The guide for this process is LOGC Memorandum 351-1. During FY 76, the following studies/systems/doctrine were incorporated into school programs of instruction:

<u>Subject</u>	<u>Date Completed</u>
Area Rearming-Refueling System	Jul 75
Echelons Above Division-Expanded	Nov 75
Basic Issue Items Policy	Jan 76
Repair Parts Support of Construction Equipment	Feb 76
Physical Inventory Procedures for DSU/GSU Supply	
Echelons	Mar 76
Combat Oriented General Support	May 76
Maintenance Standards	Jun 76
Film on Emerging Logistics Systems by MG Graham	
(FOCUS 76)	Jun 76

Twelve subjects were identified for future integration into school programs of instruction.

Included within this project was training on the Standard Army Intermediate Level Supply Subsystem (SAILS) being conducted at the US Army Logistics Management Center (ALMC). In April 1976, the Logistics Center requested ALMC to schedule three additional FY 76 classes in SAILS training because of the demand for such training by field elements, and ALMC responded favorably. The need was also seen for the development of an exportable journeymen level training package which could be used

by field elements to train personnel in SAILS procedures. This package, as finally designed, is to consist of eight individual modules:

<u>Title</u>	<u>POI Hours</u>
Materiel Management	80
Materiel Management (COSCOM)	10 (+70 Common Hrs Above)
SAILS Plus	30
Customer Assistance	24
Retail Outlets	24
Inventory and Storage	24
SAILS system Orientation	24
Satellite Operations	24
	<u>240</u>

ALMC discovered that additional resources were needed to develop and maintain this exportable package, and these resources were made available in October 1976. In the meantime, five professional personnel were TDY to ALMC during the period 1 June--30 September 1976 to develop the first two modules of the package.

Beginning in June 1976, sustainment training packages for two subsystems of the Combat Service Support System (CS<sub>3</sub>) were developed. These two subsystems were the Division Logistics Systems (DLOGS) and Maintenance Reporting and Management (MRM). The Quartermaster School was tasked to develop the DLOGS package, and the Ordnance School was assigned the responsibility to engineer the MRM package. When completed, the packages will be available to all field units (including reserve) which are users of these subsystems.

#### Planning for the Future: The Master Mechanic Concept

Renewed emphasis is being placed on doing as much maintenance and repair as far forward as possible. The importance of this was highlighted by the accomplishments of the Israelis in the 1973 war. It has been said that they performed maintenance miracles on the battlefield. With limited resources we must learn to repair and return equipment to combat as rapidly as they did.

MG Erwin M. Graham, Jr.<sup>13</sup>

The losses which occurred in the battles of World War II pale in comparison to the devastation of life and property which results from the vastly increased firepower and mobility of today's Army. If there

<sup>13</sup> MG Erwin M. Graham, Jr., "The Emerging Logistics System," Army Logistician, VII, 5 (Sep-Oct 1975), 6.

were any doubts about that, they were quickly eliminated in the fire and smoke of the Arab-Israeli War of 1973. In the words of FM 54-10, "... in the Mid-East War of 1973, the level of destructiveness approached that once attributed only to nuclear weapons. Both sides sustained devastating losses, approaching 50 percent in less than two weeks of combat."<sup>14</sup> Among the most significant factors which contributed to the Israelis' ability to turn initial disaster into an offensive which promised certain victory was their ability to return damaged tanks quickly to battle. At the beginning of the conflict, Israel had approximately 2,800 tanks available for combat, including replacement vehicles from the United States. Of these, 750-1,075 tanks were lost in battle. Yet the final inventory showed that Israel still had 1,725-2,050 tanks. In order to achieve this level of availability, many battle-damaged tanks had to be repaired two or three times. The rather astounding conclusion is that the Israelis returned to battle more tanks than they owned. To do this, excellent training and highly developed technical skills were required. Onsite forward maintenance performed by highly proficient mechanics helped insure the most efficient use of the total tank system. The major lesson which the United States learned was that on today's battlefield, we must have a level of technical expertise which insures the maximum use of every weapons system.

Unfortunately, what we have found out is that our mechanics today do not have the requisite skills necessary to analyze and organize maintenance efforts. In a field test at Fort McClellan, using Vietnam damaged tanks, we discovered that our mechanics and their supervisors were hard-pressed to analyze the needed repairs, to organize the maintenance effort, and to effect rapid repair--even though four operational tanks were possible by cannibalizing the seven available. In order to remedy this situation, the "Master Mechanic" program has been suggested. The aim of the program is to provide expert and comprehensive maintenance as far forward in the battlefield as possible. At the general and direct support levels, the master mechanic, an E-6 or above, would insure that good maintenance practices are followed and assist in cannibalization efforts on the battlefield. Beyond that, at the organizational level he will provide early diagnosis of maintenance problems and will relay this information to the direct and/or general support contact teams so that they are better prepared when they come forward. He will also assist in training and supervising apprentice and journeyman mechanics.

The Master Mechanic Program was one facet of the Total Tank System Study, which was established by General DePuy on 4 February 1976 to address the "total" tank system, including training, hardware, logistics,

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<sup>14</sup> FM 54-10, Logistics: An Overview of the Total System, February 1977, p. I-1.

d. What are the feasible alternatives for restructuring logistical support to minimize the difference between "a" and "b."<sup>19</sup>

This guidance created some confusion at the Logistics Center since it was not clear how the Master Mechanic concept was to be integrated with the above tasks or where the overall priorities lay. In order to clarify exactly what the Logistics Center was to do, a meeting was held on 26 March with the TRADOC team chief, LTC (P) Bahnsen. As a consequence of this meeting, several specific tasks were assigned to various Logistics Center directorates and certain prior assumptions were made concerning operational readiness, such as that the report level of operational readiness may not reflect the true status of equipment in operational units or that the equipment operationally ready standards for tank systems provided in AR 750-52 are not the optimum standards which can be expected under favorable conditions in peacetime. It was furthermore decided that the Logistics Center should concentrate efforts on examining organizations below the corps GS and that resource constraints should not be considered a factor in determining operational and training requirements.<sup>20</sup>

While the division of effort which followed expedited the LOGC input into the Total Tank System Study, there still remained a certain lack of coordination and planning. This was noted by General DePuy in an In-Process Review given to him by the LOGC on 26 April. He observed that the efforts "appeared discursive and that the recommendations offered appeared to be without analytical backup."<sup>21</sup> He wondered aloud whether the study was really focused on the critical issues. In consequence, General DePuy directed that the LOGC study group concentrate on a more modest approach and develop alternatives to the present tank maintenance system which were both required and cost effective. The Logistics Center thereupon redefined and narrowed its objectives so that the development of the Master Mechanic Program became the focal point of its efforts. The Director of the Training and Education Directorate was given the overall responsibility to construct the program and was authorized to task other LOGC elements and appropriate schools as required.<sup>22</sup>

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<sup>19</sup> Msg ATPR-ACE, priority, McClellan to Graham, personal, 162046Z Mar 76, subj: TTS Tasking.

<sup>20</sup> MFR, ATCL-DPO, MAJ Craig W. Brammer, 30 March 1976, subj: Status of Total Tank System Study.

<sup>21</sup> DF, ATCL-DPO, ODCSOPS (MAJ Brammer) to D, T&E, 20 April 1976, subj: Total Tank System Study (T<sup>2</sup>S<sup>2</sup>) Tasking.

<sup>22</sup> Ibid.



The Training and Education Directorate was expected to accomplish three subtasks in its construction of the Master Mechanic Program: (1) demonstrate a need for the master tank mechanic at the tank company/battalion level, (2) outline a career development and progression program and develop an authorization program for the master tank mechanic throughout the entire tank maintenance system, and (3) develop cost data for the master mechanic program.<sup>23</sup> To do this, there was no question that other directorates would have to become involved. The Organization Directorate, at the request of the Director of Training and Education, Colonel Hance, supplied the standard approved annual maintenance man-hours for MOS 63C, track vehicle mechanic, on the 105mm tank which was required per year per tank. The Organization Directorate also recomputed the strength of the 63C at tank battalion and company levels based upon the movement of various functions to a lower level forward.<sup>24</sup> The Materiel Directorate, at Colonel Hance's behest, established the base line requirements for tool sets and test, measurement, and diagnostic equipment required for tank companies with master mechanics.<sup>25</sup> In addition, several working conferences were held with representatives from the Armor and Ordnance Schools to work out differences on the master mechanic concept. The refined concept was presented to General Graham on 2 June 1976, and, with his concurrence, it was briefed to General DePuy at TRADOC two days later. General DePuy approved the concept.

On 15 July 1976, General DePuy briefed the Chief of Staff of the Army on the Total Tank System Study. The Chief of Staff approved the study concept and directed TRADOC to proceed with preparations to assist a DA task office about to be organized to implement the T<sup>2</sup>S<sup>2</sup> recommendations. One of these recommendations was to have master mechanics throughout the entire tank maintenance system. The Logistics Center was shortly thereafter tasked to prepare a training program to support the tank master mechanic program, and it tasked the Ordnance and Armor Schools for assistance.<sup>26</sup> The proposals which were received from these schools on the training program for the master mechanic were at variance with each other and with the position of the Logistics Center. At the end of FY 76, while all concerned expressed confidence in the idea of the master mechanic, significant differences remained to be reconciled.

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<sup>23</sup> Ibid.

<sup>24</sup> DF, ATCL-TP, D, T&E, to D, ORG, 10 May 1976, subj: Master Mechanic; DF, ATCL-ORO, D, ORG, to D, T&E, 12 May 1976, subj: Master Mechanic.

<sup>25</sup> DF, ATCL-MM, D, MAT, to D, T&E, 14 May 1976, subj: Test, Measurement, and Diagnostic Equipment.

<sup>26</sup> Msg, ATCL-TP, CDRUSALC to CDRUSAOCCS, 301530Z Jul 76, subj: Tank Master Mechanic.

## IX

### UNIT TRAINING

Army Training and Evaluation Program (ARTEP). In February 1974, General DePuy directed the establishment of a single training document which would replace the Army Training Programs (ATP) and Army Training Tests (ATT) which dated back to the beginning of World War II. General DePuy indicated that he wished the new document to serve the purpose of both evaluator and trainer.<sup>1</sup>

As a consequence of the TRADOC Commander's initiative, an entirely new type of training publication was produced, the ARTEPs. Interim guidance was provided in TRADOC Circular 310-1, Preparation of Army Training and Evaluation Programs. ARTEPs were intended to assist Active Army and Reserve Component (RC) units in the planning, conducting, and evaluating of their training. Essential wartime missions and related tasks which a unit had to master in order to be combat ready were identified. Unit proficiency was judged according to mission performance rather than to strict adherence to detailed or elaborate procedures. Because of the rate of personnel turnover in many Active Army and Reserve Component units, concurrent multi-echelon training and evaluation was encouraged.<sup>2</sup>

On 9 May 1974, General Walter T. Kerwin, Jr., the commanding general of FORSCOM, met with General DePuy to exchange views on ARTEP development. The result of this meeting was that close coordination was established between FORSCOM and TRADOC on the Army Training and Evaluation Program. The Infantry School's program was selected as the model for all ARTEPs.<sup>3</sup> While this choice was an accurate reflection of FORSCOM's concern with the ability of the combat arms to meet wartime conditions, it did not, it soon became apparent, allow enough flexibility for ARTEPs, so constructed, to be applied effectively to combat service support units.

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<sup>1</sup> Annual Report of Major Activities, FY 1974, TRADOC, p. 103 (SECRET--Info used is UNCLASSIFIED).

<sup>2</sup> Ibid., p. 104.

<sup>3</sup> Ibid., p. 103.

The problems became apparent when the first ARTEPs were submitted to TRADOC by three of the LOGC associated schools: 10-7, Supply and Service Company; 9-38, Ordnance Company Conventional Ammunition; and 55-128, Medium/Heavy Boat Company. These ARTEPs caused a thorough reconsideration of program, for they raised several significant questions. Brigadier General Paul F. Gorman, TRADOC Deputy Chief of Staff for Training, wrote a letter to MG Graham in which he admitted, "Frankly, we may have erred in not thinking beyond the combat arms."<sup>4</sup> Specifically, General Gorman suggested that the logistics community decide: (1) Do we need an ARTEP for all units in the force structure? (2) Is there a better way to train and evaluate a unit which, unlike a maneuver battalion, does not operate as an entity, but rather as a small detachment, with the headquarters acting merely as an administrative and logistics agent? and (3) As a corollary to the above question, are there units which could be more properly evaluated, either wholly or in part, by testing individual proficiency, via MOS performance tests or SQT?<sup>5</sup> In response to General Gorman's queries, a formal review was begun by the LOGC staff on the subject of developing ARTEPs for combat service support units.<sup>6</sup>

Representatives from the T&E, C&D, Org, and LOGEX directorates, as well as from the Logistics Training Board, met on 19 November to address General Gorman's concerns. They agreed on a number of guidelines in regard to ARTEP development:

1. An ARTEP will be modular in design and format.
2. An ARTEP will not be produced for all TOE units.
3. MOS test scores can be used to evaluate proficiency of selected units or individual skills.
4. The LOGC will approve priorities for each associated school in the development of their ARTEPs.
5. There will be standardized ARTEPs for certain type units.
6. In those cases where ARTEPs will not be prepared for low priority units, the current Army Training Test and Training Program will continue to be used.

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<sup>4</sup> Ltr, ATTNG-AS-L, BG Gorman to MG Graham, 8 November 1974.

<sup>5</sup> Ibid.

<sup>6</sup> Ltr, ATCL-TTQ, MG Graham to BG Gorman, 21 November 1974.

7. In designing the tactical/operational mission module of the ARTEP, a training and evaluation outline consisting of the three REDCON levels, tasks, conditions, and standards should be developed for each subordinate element of the unit.<sup>7</sup>

Additionally, two alternatives were suggested as formats for the ARTEP: existing field manuals, alternative one, and training circulars, alternative two. The Logistics Center favored alternative one.<sup>8</sup>

The LOGC associated schools were asked to comment on the position established by the Logistics Center. They were also directed to provide other information needed to formulate the complete Logistics Center ARTEP development program. This information included such items as the identification of units which did not require ARTEPs, MOSSs and TOE teams that should be tested by MOS test scores, common portions of ARTEPs that may be used by different units by staff section and/or function, and other means by which common elements may be evaluated in lieu of MOS tests or ARTEPs.<sup>9</sup> The associated schools' responses, while not unanimous in agreement, did "reflect general concurrence with the LOGC developed approach." The Directors of C&D, ORG, and LOGEX, as well as the Chairman of the Logistics Training Board, were asked to comment on the responses of the associated schools in preparation for completing of the formal LOGC response to General Gorman.<sup>10</sup> Input was also solicited from the Combined Arms Center and the Army Administration Center. Specifically, the Centers were asked for their comments and concurrence on

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<sup>7</sup>MFR, ATCL-TTQ, COL Henry G. Allard, Director, T&E, 10 December 1974, subj: Logistics Center's Position for the Army Training and Evaluation Program (ARTEP) Development.

<sup>8</sup>Ibid.

<sup>9</sup>Ltr, ATCL-TTQ, MG Graham to associated school commandants, 12 December 1974, subj: Logistics Center's Position for the Army Training and Evaluation Program (ARTEP) Development, also inclosure three of the same letter.

<sup>10</sup>DF, ATCL-TTQ, COL Allard to Directors of C&D, ORG, and LOGEX, and the Chairman of LTB, 31 January 1975, subj: Special Study on ARTEP, ACN 22892.



utilizing and expanding the modular concept of ARTEP development.<sup>11</sup>  
Both Centers concurred that this approach was feasible and preferable to other approaches.<sup>12</sup>

Finally, on 5 March 1975, the LOGC sent its reply to TRADOC. The following specific recommendations were made:<sup>13</sup>

1. Those nonmission functions which are common to all company size units should be developed into separate modules.
2. Based upon low density, criticality of missions, and other salient factors, there is no need to develop an ARTEP for all units in the Army force structure.
3. The use of SQT test scores can be used as a means of evaluating the proficiency of selected units and individual skills.
4. The LOGC will approve the priorities established by the schools for developing ARTEPs.
5. The current ATT/ATP should continue to be used by those units for which an ARTEP would not be developed.
6. The related Field Manuals should be used as the basic ARTEP reference rather than develop a separate Training Circular to support each ARTEP.

After obtaining guidance from General Depuy and soliciting comments from FORCOM on the LOGC recommendations, General Gorman sent his response

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<sup>11</sup> Ltr, ATCL-TTQ, COL Allard to Commanders of the Combined Arms Center and the Administration Center, 10 February 1975, subj: Army Training and Evaluation Program (ARTEP).

<sup>12</sup> Msg, 151310Z April 1975, Commander of the USA Administration Center to Commander of the USA Logistics Center, subj: Army Training and Evaluation Program (ARTEP); Ltr, ATSW-DD, CPT John V. Radoll, US Army Combined Arms Center and Fort Leavenworth, to Commander, US Army Logistics Center, 14 May 1975, subj: Army Training and Evaluation Program (ARTEP).

<sup>13</sup> Ltr, ATCL-TTQ, COL Allard to Commander, TRADOC, 5 March 1975, subj: Special Study on Combat Service Support (CSS) Unit Army Training and Evaluation Program (ARTEP).

to the LOGC on 2 May; it was a response which revealed significant differences in approach from those suggested by the Logistics Center. One of the strongest reservations was raised about the use of the modular concept in the construction of ARTEPs. General Gorman thought that this approach would "get quickly out of hand and result in a hodgepodge of dissimilar modules that fail to mesh into a comprehensive package."<sup>14</sup> However, he agreed to let the work go on along these lines "on an experimental basis."<sup>15</sup> General Gorman emphasized, too, that the goal should be to provide a suitable ARTEP for each TOE unit, thus concurring with the position of FORSCOM and the Quartermaster School. Another LOGC recommendation, that the ARTEP training and evaluation utilize three REDCON levels, caused General Gorman additional concern. He stated, "The references to REDCON in discussing the ARTEP levels should be discontinued. . . , the rationale being that ARTEP evaluations would be inflated, thus destroying the ARTEP's diagnostic role."<sup>16</sup> Finally, General Gorman expressed doubts that existing training literature could be utilized to accomplish ARTEP missions, whether the literature be in the form of Training Circulars or Field Manuals. He suggested that the Logistics Training Board and the Combat Arts Training Board (CATB) work together on this problem.<sup>17</sup> At a 16 May meeting, General DePuy expressed his desire to General Gorman that the Logistics Training Board press the development of training in logistical units. General DePuy felt that the development of training, both collective and individual, for logistical units had fallen behind training development for the combat arms.<sup>18</sup>

In a 4 June letter to the TRADOC DCST, General Graham expressed his appreciation for General Gorman's "conditional endorsement" of the LOGC recommendation. However, the LOGC Commander reiterated the Logistics

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<sup>14</sup> Ltr, ATTNG-AS-CT, MG Gorman to MG Graham, 2 May 1975. BG Gorman had recently been promoted to Major General.

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> Ltr, ATTNG-AS-CT, MG Gorman to MG Graham, 23 May 1975.

Center's support of the modular concept for ARTEP development: "Based upon your rationale for disapproval, there may be a misunderstanding of the objectives of the concept in that it is designed to preclude the very thing which you anticipate will occur as a result of its implementation. . . ."19 Nevertheless, General Gorman maintained his position: "I am not persuaded that the Armor ARTEP, as an example, will be improved by incorporating a convoy module prepared by the T School, a maintenance module prepared by the Ord School and a mess module prepared by the QM School."20 The issue remained unresolved, although General Gorman did repeat his directive that the associated schools be allowed to proceed with the modular concept on an experimental basis.21

A briefing on the development of the ARTEP was given to General DePuy on 6 October 1975. The General noted that only battalion level units and below were included in the scheduled program and inquired whether logistical ARTEPs were being written for logistics units above the battalion level. He then suggested that the LOGC conduct a feasibility study to determine if the "LOGEX-Local" packet could be used as the basis for a Brigade/Group ARTEP. 22

The Logistics Training Board selected TOE 55-62H as the test vehicle. A study was conducted, and the conclusions reached were (1) LOGEX-Local packets support, but cannot stand alone, in the ARTEP development (2) Except for certain areas, LOGEX National and Regional Exercise force structure, manning levels, and play situations were adequate to test and evaluate the ARTEP, and (3) ARTEP would be applicable to group level headquarters with only minor modifications.23 In light of the generally encouraging conclusions of this study, the LOGC developed the actual

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19  
Ltr, ATCL-TTG, MG Graham to MG Gorman, 4 June 1975.

20  
Ltr, ATTNG-AS-CT, MG Gorman to MG Graham, 30 June 1975.

21  
Ibid.

22  
Ltr, ATCL-LA, BG Vuley to Commandant, US Army Transportation School, 19 December 1975, subj: Transportation Brigade ARTEP.

23  
Ibid.

Transportation Brigade ARTEP and tasked the Transportation School to provide resources to produce the ARTEP and assume administrative responsibility.<sup>24</sup> By the summer of 1976, a draft ARTEP for the Headquarters and Headquarters Company, Transportation Brigade, had been developed by the LOGC and produced by the Transportation School. The Seventh Terminal Group at Fort Eustis, the 184th Transportation Brigade (ARNG) at Laurel, Massachusetts, and the 143d Transportation Brigade (USAR) at Orlando, Florida, also contributed to the development of this ARTEP, the first one ever developed for staff training and evaluation above the battalion level. Distribution and coordination of the draft edition was accomplished during the late summer and early fall of 1976.

Already, in the spring of 1975, the LOGC staff became concerned with the introduction of ARTEPs into Reserve Component units. These units are, by the very nature of their operation, "more dependent upon current training literature for unit readiness than their counterparts in the Active Army."<sup>25</sup> Thus, commanders of these units were particularly concerned about the development of suitable ARTEPs as quickly as possible. In the middle of April, the Logistics Training Board proposed 21 ARTEPs be prepared by the Reserve Components. These ARTEPs had been assigned a low priority by the proponent schools. Action officers at both the NGB and the OCAR enthusiastically endorsed the project. The Training and Education Directorate was tasked with the responsibility with securing concurrence from the proponent schools for this procedure.<sup>26</sup> Consequently, Colonel Allard, Director of T&E Directorate, sent a letter to the four associated schools on 25 April in which he requested comments from them on the feasibility of the proposed program. The schools were also asked to nominate ARTEPs which, in their opinion, could be developed by RC personnel.<sup>27</sup> By the end of May, all the schools had complied by selecting

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<sup>24</sup>  
Ibid.

<sup>25</sup>  
Ltr, ATCL-TTQ COL Allard to associated school commandants, 25 April 1975, subj: Army Training and Evaluation Program (ARTEP).

<sup>26</sup>  
DF, ATCL-TB, COL Hugh H. Johnson, Chairman of the LTB, to D, T&E, 18 April 1975, subj: ARTEP.

<sup>27</sup>  
Ltr, ATCL-TTQ, COL Allard to associated school commandants, 25 April 1975, subj: Army Training and Evaluation Program (ARTEP).



ARTEPs which could be developed by RC units.<sup>28</sup> FORSCOM also concurred with the concept.<sup>29</sup> The result was that, by the end of 1975, the LOGC associated schools were assisting RC units in the development of seventeen ARTEPs. Coordination was conducted through appropriate TAG or ARCOM channels. This program will expedite development of ARTEPs, provide meaningful training for RC units, and will identify additional resources for the associated schools in their increasing training literature production requirements.

The responsibility for the Army Training and Evaluation Program was switched from the Training and Education Directorate to the Logistics Training Board on 1 October 1975. The program itself continued to expand. The Logistics Center and its associated schools were proponents for 208 separate TOE covering 1382 units in support of the development of ARTEPs. At the end of FY 76, ninety-one ARTEP were being worked on which covered 145 TOE and 1246 units. Thirty-two draft ARTEPs had been received by the LOGC from the associated schools for coordination and review: five from the MMCS, six from the TSCH, fifteen from the QM, and six from the OC&S. LOGC ARTEP project officers visited the associated schools and TRADOC Headquarters in order to expedite coordination of both test and DA copy ARTEP editions. The first ARTEPs released by TRADOC for camera copy and DA print were ARTEP 29-17 (Forward Support Company) and 55-167 (Assault Support Helicopter Company). On 14 June 1976, the LOGC published Reg 350-1, Army Training and Evaluation Program (ARTEP) to supplement TRADOC Reg 310-2, 3 May 1976, on the same subject. The Logistics Center Regulation established policy for the development and coordination of logistic ARTEPs both within the Center and between the Center and the associated schools. The LTB was formally given the responsibility for overall management of the problem.

Up until this time there were five distinct stages in the ARTEP developmental cycle. They were (1) task analysis, (2) coordination draft, (3) test edition/validation, (4) camera-ready copy, and (5) DA print. This entire cycle encompassed a 24-month period. Using

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<sup>28</sup> Ltr, ATSP-CTD-OT, MAJ Joseph F. Peters, US Army Transportation School, to Commander, US Army Logistics Center, 8 May 1975, subj: Army Training and Evaluation Program (ARTEP); Ltr, ATSK-CTD-DL, Commandant, Missile and Munitions Center and School, to Commander, US Army Logistics Center, 25 April 1975, subj: Army Training and Evaluation Program (ARTEP); Ltr, ATSM-CTD-TL, CPT Thomas W. Britt, US Army Quartermaster School, to Commander, US Army Logistics Center, 23 May 1975, subj: Army Training and Evaluation Program (ARTEP); Msg, 151840Z May 1975, Commander, US Army Ordnance Center and School, to Commander, US Army Logistics Center, subj: Army Training and Evaluation Program (ARTEP).

<sup>29</sup> Msg, 241115Z July 1975, Commander, FORSCOM, to Commander, US Army Logistics Center, subj: Army Training and Evaluation Program (ARTEP).

units were not provided an ARTEP document for use until the end of the cycle. Because of the lack of substantial comments received during the test edition/validation stage, the Logistics Center questioned the requirement and cost effectiveness of this stage; and the Logistics Training Board initiated action which eventually resulted in the elimination of this phase of the developmental cycle. The consequence was that using units received the ARTEPs 9 to 12 months earlier than originally planned. This effort reflected the continual effort of the Logistics Training Board to improve the Army Training and Evaluation Program.

Training Developments. The Logistics Training Board solicited information from RC units concerning training innovations, ideas, or approaches which have been successful in resolving inactive duty training problems and which could be used by other training managers. These "tips" were reviewed, evaluated, consolidated and forwarded to FORSCOM and subsequently published in FORSCOM Training Bulletin Number 3, 11 June 1976.

The 167th MMC, ARNG, and the 310th TAACOM MMC (Prov), USAR, were furnished ten copies each of SAILS Technical Manuals (TM 38 series) to assist in the conduct of home station training. They were also placed on pinpoint distribution accounts for the issue of subsequent changes to the TMs. In addition, master sets of an 18-hour block of self-paced QMS SAILS instructional material were provided for use in home station training. Coordination was initiated with the 310th TAACOM MMC (Prov), Fort Velvoir, Virginia, to determine the feasibility of physically locating a remote terminal in the USAR armory for the purpose of remotely playing QMS ADP simulations.

Action was initiated with the QMS to determine the feasibility of training assistance for RC MMCs which would include: (1) monitoring of selected blocks of resident instruction in SAILS and materiel distribution, (2) conduct of a tailored 80-hour RC course in materiel and distribution management, (3) provision of copies of self-paced material covering a total 104-hour block of distribution management, and (4) restructuring, reprogramming, or otherwise making available on an exportable basis additional appropriate QMS simulations. Coordination was also initiated with the ALMC for the conduct of resident and onsite SAILS instruction for RC MMC and with the TSCH to develop similar training assistance for the MMCs.

The Logistics Training Board hosted a Logistics Training Conference on 25 November 1975. Representatives from each of the associated schools and interested LOGC directorates attended. The purpose of the conference was to afford the LOGC an opportunity to present its objectives and program to assist in improving unit level training in Active Army and Reserve Component units and to receive information about the associated

schools' training programs for personnel in units. Also, priorities were coordinated based on TRADOC guidance, and unit training problems were discussed.

MG Graham stressed at the conference the importance and high priority of the Army Training and Evaluation Program. General Graham summed up his remarks by stating that the main thrust has to be the end proficiency of a unit performing its mission and ARTEPs are being written in an effort to measure this. The conference, which was chaired by COL Raymond G. Rennebaum, Director of the Logistics Training Board, was an excellent beginning. It clearly demonstrated the need for this type of exchange with emphasis on priorities and specific training problems.

Several training assistance visits were made by LTB representatives during 1975-76 to CONUS Army Headquarters, Army Readiness Regions/Readiness Groups, and Army Reserve Component (RC) units. The primary purpose of these trips was to participate in RC training meetings and conferences and to discuss and coordinate training developments, activities, requirements, and inhibitors. One of the major requirements which became evident during these visits was the need for a RC Logistics Training Conference, and the Logistics Center hosted the first conference at Fort Lee, Virginia, 28-30 September 1976. Guest speakers at the conference were the Honorable William D. Clark, Deputy Assistant Secretary of the Army (Reserve Affairs) and Brigadier General John D. Bruen, Director of Materiel Readiness, Office of the Deputy Chief of Staff, Department of the Army.

The purpose of the conference was to inform the conferees of the latest developments concerning new and emerging doctrinal, organizational, and training changes within the TRADOC logistics community; to provide a forum for the discussion of RC logistic training problems and solution alternatives; and to identify logistic training requirements for appropriate action.

The conference was attended by 125 active Army logisticians and trainers from 30 major headquarters, schools, and staff agencies throughout the United States. The primary conferees were the key active Army logistic coordinators and training managers of the Continental US Armies (CONUSA) and Army Readiness Regions (ARR) associated with RC training. In addition to the CONUSA and ARR conferees, the conference was supported by representatives from DA including the Office of the Deputy Chief of Staff for Logistics, National Guard Bureau, and the Office of the Chief of Army Reserves; Headquarters, Forces Command including Office of Deputy Chief of Staff for Operations and Office of Deputy Chief of Staff for Logistics; Headquarters, Training and Doctrine Command including

Office of Deputy Chief of Staff for Training, Office of Deputy Chief of Staff for Logistics, Army National Guard and US Army Reserve Advisors, Training Management Institute, and Combat Arms Training Board; Headquarters, Development and Readiness Command; Army Administration Center; Reserve Components Personnel and Administration Center; Army Training Support Center; Army Command and General Staff College; Army Troop Support Agency; Army Computer Systems Command; Army Logistics Center and its four associated schools: Quartermaster, Transportation, Missile and Munitions, and Ordnance Schools.

During the conference, 27 separate presentations were given on training related subjects and over 20 training problem items were discussed in open discussion. The conference was divided into two phases. The first phase consisted of information briefings by the Logistics Center, the Training Support Center, and the Quartermaster, Transportation, Missile and Munitions, and Ordnance Schools. The presentations covered existing and planned programs designed to support the training of personnel in units on an individual and collective basis. The main theme of the presentations of the associated logistics schools was the availability of non-resident or exportable training packages. Additionally, the briefings addressed recent changes in doctrine and organizations expected to affect RC logistics training over the next two years. During the second phase of the conference, voluntary presentations on innovative training programs were made by representatives from First Army and ARR V and ARR VII. The second phase was concluded by an open discussion addressing the training problems identified by the CONUSA and ARR representatives.

Mr. Clark discussed the importance of Reserve Component forces in the total force policy which integrates the Active, Guard, and Reserves into one Army. Mr. Clark emphasized new initiatives underway at the Department of the Army to improve the strength and readiness posture of the Reserve Component forces. Brigadier General Bruen said that the Army's fundamental mission in peacetime is readiness. He stressed the increased reliance which has been placed on the Reserve Component forces today. BG Bruen discussed the Army's ongoing logistics improvement actions designed to strengthen Reserve Component force readiness.

Improved MOS Training. The Logistics Training Board arranged for and monitored the following special training for MMC personnel during the year:

- a. During the week of 14-18 June 1976, 20 selected community managers of the 167th COSCOM MMC received an 18-hour block of QMS SAILS self-paced instruction while at Fort Pickett for the conduct of LOGEX 76.



- b. During the week of 21-25 June, the ALMC conducted a 40-hour tailored block of onsite SAILS instruction for a separate group of 20 commodity managers of the 167th MMC at Fort Pickett during the play of LOGEX 76.
- c. The QMS ran its Simulation, Corps Automated Procedures (SIMCAP), incorporating the SAILS system files and reports, for a group of 20 personnel from the 167th MMC, ARNG, and four personnel from the 310th TAACOM MMC (Prov), USAR, on 19-20 June 1976.

The program to improve RC Aircraft Maintenance Training proved successful during the year with over 300 students enrolled. The Program is primarily designed for training of personnel in RC GS Aircraft Maintenance Companies and is tailored into three phases: Phase I, consisting of 80-hours at the service school; Phase II, 160-hours conducted during IDT; and Phase III, 80-hours wrap-up at the service school where proficiency is verified and MOS awarded, as appropriate. The USA Transportation School began Phase III at Fort Eustis during FY 76-4. Responsibility for the program was transferred to the Transportation School on 20 September 1975, with monitorship maintained by the LOGC.

In response to a request from the Minnesota National Guard, a specially tailored portion of the self-paced supply clerk course for MOS 76Y20 was provided to the 47th S&T Battalion. The battalion selected 47 hours from the course and scheduled three weekend drills to cover the material which was provided by the QMS. Utilizing the Educational Telephone Network, a qualified service school instructor was available to respond to questions beyond the capabilities of the onsite proctor. The exportability and quality of the package were confirmed by the excellent results of the training.

During FY 7T, an orientation visit to the LOGC by DARCOM RC advisors was coordinated and conducted. As a result of this visit, a number of areas of mutual interest were identified which related to improved MOS training. Twenty-five copies of the DARCOM booklet were requested and distributed to interested customers. This booklet outlines the DARCOM capability to conduct specific MOS training at depots. A DARCOM representative briefed attendees at the LOGC RC Logistics Training Conference on this program. The COILS study group was also made aware of this program for possible interface and potential training value as part of that study. The status of food service training (MOS 94) was reviewed and available training materials documented.

### Training Exercises

A study/review of LOGEX was directed by the Deputy Chief of Staff for Logistics, Department of the Army, in late 1974. The Logistics Center performed the study as the study agency for the US Army Training and Doctrine Command. The objective of the study was to examine the effectiveness of, alternatives to, and potential resource savings in CS and CSS Command Post Exercises (CPX) prepared by the then Logistics Exercise Directorate of the LOGC, particularly as this applied to the sixteen division force. The study, completed in May 1975, recommended a training plan for the CPX training of Reserve Component combat support and combat service support units of Group size or larger. It further recommended that a new exercise be prepared every third year as opposed to the current annual preparation. The study concluded that there were potential resource savings associated with the preparation and conduct of CS/CSS CPX which could be realized by varying the frequency of exercise preparation, restricting participation, and reducing transportation costs through the increased use of Regional Exercises. Other recommendations on assignment of responsibilities for the preparation and conduct of the various forms of CS and CSS exercises to DA, TRADOC, FORSCOM were included in the study.<sup>30</sup> Some of these recommendations were later modified by the Department of the Army.<sup>31</sup>

LOGEX/RC 75. By the end of March 1975, the LOGEX Division had completed most of the intermediate planning requirements for the LOGEX/RC 75 exercise and had initiated final actions for many of the exercise programs. Preparation of most of the exercise publications, exclusive of the messages, had also been completed. The Division conducted a one-day interbranch conference on 6 March 1975 to assess functional area objectives and to improve action officer coordination. Detailed coordination and exercise planning continued with the US Army Service Schools, various US Army agencies and commands, and other LOGC directorates. The pre-exercise conference was held at the Noncommissioned Officers Open Mess, Fort Pickett, Virginia, on 22 March. Reserve Component unit participants were briefed by the Logistics Exercise Directorate and by the Fort Pickett staff on various aspects of the exercise and site

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See the Review of LOGEX, Final Report, US Army Training and Doctrine Command, US Army Logistics Center, May 1975, especially the summary and recommendations in chapter 8.

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Ltr, DALO-PLR, BG Hiram K. Tompkins, Director of Logistics Plans, Operations and Systems, to Commander, TRADOC, 2 October 1975, subj: Study--Review of LOGEX (Project LEAP Issue #145). The Logistics Center's response is in ltr, ATCL-L, BG Vuley to Commander, TRADOC, 1 December 1975, subj: Study--Review of LOGEX (Project LEAP Issue #145).

support requirements. An advance issue of LOGEX/RC 75 play material was provided to representatives of the player units. The briefing was followed by functional area discussions between LOGEX Division personnel and RC unit representatives. The exercise exposed players to realistic problems associated with supporting a contingency force. It also impressed upon the RC unit commanders and staffs the fact that the ability to sustain an effective fighting force is dependent upon the foresight and responsiveness of the supporting forces. An invaluable contribution was made by the representatives of the other services who participated in the exercise. The joint service training arena is mutually beneficial and is necessary if the military services are to recognize and learn to cope successfully with each others requirements. There were three major training objectives for the exercise:

- a. Train the participants in combat support and combat service support command and staff techniques in a short duration nonactive nuclear war emphasizing interdependence among military services operating as an armed forces team within the theater of operations.
- b. Emphasize the need for interface between combat, combat support, and combat service support organizations, activities, and functions.
- c. Introduce existing combat support and combat service support doctrine and proposed concepts.

The 1,523 people associated with LOGEX/RC 75 consisted of 1,070 players assigned or attached to 29 RC units and supported by 218 controllers and reactors, 164 administrative and site support personnel, and 71 members of other services. This exercise revealed that the ratio of players to all others is not directly proportional. It is possible to increase the number of players within units without a major increase in costs. Increased player positions were programed for 1976.

The exercise cost \$176,832 or approximately \$165.00 per player. The largest individual expenditure was for TDY, \$38,586. About \$35,000 was spent for civilian labor for exercise preparation and during the exercise itself. Other significant expenditures include equipment rental and ADP services.

LOGEX 76. This exercise was the twenty-ninth in a continuing series of annual exercises. TRADOC concurred in the LOGC proposal to maintain the basic LOGEX 75 scenario as that would best meet the FORSCOM requirements for 1976. Unit requirements and manning levels for the scenario were completed by the Logistics Training Board and were forwarded to FORSCOM headquarters on 30 July 1975. There were 80 units with a total of 1,300 personnel requested as players. In addition to the

units, 2,960 officer and 474 enlisted man-day spaces were requested from the Individual Ready Reserve (IRR). Headquarters FORSCOM also approved 122 officer and 655 enlisted troop program spaces from Reserve Component units for support of the exercise.

The Department of the Army Headquarters, in September 1975, extended formal invitations to participate in LOGEX 76 to the Navy, Air Force, and Marine Corps. The Navy and Air Force responded affirmatively; however, the Marine Corps, because of other commitments, expressed the desire to limit their participation to sending observers from the Marine Corps Headquarters and the Reserve. Greater participation in future exercises was anticipated. Joint service conferences were held throughout the preparation of the exercise, starting in August 1975. Naval and Air Force representatives were briefed on the exercise, its parameters, objectives, and requirements, and their role in scenario development. The planning agencies involved were the Military Sealift Command (MSC), Military Airlift Command (MAC), and the Tactical Air Command (TAC).

TRADOC Cir 350-6, Directive for LOGEX 76, 5 January 1976, provided the planning guidance, parameters, and exercise objectives. It also outlined the responsibilities for preparing and conducting the exercise. FORSCOM Cir 350-6, Directive for LOGEX 76, identified the participating units and specified unit responsibilities. FORSCOM selected 23 active Army, 29 National Guard, and 12 Army Reserve units as players for LOGEX 76. This marked the first occasion for Active Army unit involvement in the three decade history of LOGEX. It also was the first exercise in which a corps and three division headquarters were included as participants. The major playing units were headquarters elements of III Corps, 5th Infantry Division (Mechanized), 13 COSCOM--all active Army--26th Infantry Division and 28th Infantry Division--National Guard units.

The contributions of 14 service schools were coordinated and incorporated into 46 exercise documents. Primary publications covered rules of play, operation plans and orders, troop list, logistical and technical data, treaties and agreements, and an area study. Publications designed for the control organization included a controller handbook, special reactor instructions, task organized troop list, and synopsis of scenario situations. The remaining publications were devoted to administrative instructions. In addition to these documents, over 1,900 scenario situation messages were developed by the exercise staff and participating schools for introduction during the exercise.

A Preexercise Conference was conducted at Fort Pickett, Virginia, on 21 February 1976 for representatives of participating units and agencies. The units were provided an overview of the exercise and presented necessary administrative matters incidental to participation and installation support. An initial issue of all relevant exercise publications was made, including maps and overlays, to permit preexercise preparation by units.



LOGEX 76 employed a variety of management information systems to support scenario situations and present a semblance of realism in the exercise. ADP support was provided to emulate selected reports from the played standard systems which included the Maintenance Control System, Standard Army Intermediate Level Subsystem (SAILS), Prisoner of War Information System (PWIS), Division Logistics Systems (DLOGS), and the Standard Port System (SPS). Additionally, preparation of the Material Readiness Report (MRR) was automated to support players and Level 1, Standard Army Ammunition System (SAAS), was played manually.

To assist units in their preexercise preparation at home stations, representatives of LTB visited key units to provide an orientation to unit members and to explain exercise procedures. Units which were visited included all the major units, as well as the material management and movements control centers. The exercise control organization was completed in May 1976; in addition to the LTB staff, it included 112 unit and staff controllers and 146 Individual Ready Reservists as members of the reactor group. The controllers were provided from the staff and faculty of the LOGC, ADMINCEN, CGSC, and from their associated schools.

LOGEX 76 was conducted at Fort Pickett, Virginia, during the period 13 through 23 June 1976. The training schedule supported two days of preexercise orientation, one day to set requirements for the first day of play, six days of scenario play, and one day for critique and installation clearance. The exercise involved a total of 2,357 participants, including players, control organization, exercise support units, and other services. The total cost of the exercise was \$347,193.

LOGEX-Local 75. LOGEX-Local is an exportable training packet adapted from the national CS/CSS exercise, LOGEX 75, and utilizing recovered exercise materials--publications, maps, overlays, etc. The materials were tailored for a type unit to provide a 2-day CPX packet for use by a unit at its home station. Immediately following LOGEX 75, the LTB identified to HQ FORSCOM a capability to develop tailored packets for 26 type units. Based on a canvas of potential users of the CPX packets, FORSCOM provided LTB with a priority list of desired recipients for each type packet. Priorities were required since the capability to produce the local unit CPX packets was necessarily constrained by the availability of materials and the absence of separate funding to support the project. In 1975, over 500 units received packets, some 150 more than 1974. Although most of the units were from the Reserve Components, 1975 marked the first occasion that FORSCOM included active Army units in CONUS, Korea and Alaska to receive packets. Basic distribution of the CPX packets was made in November 1975. Numerous follow-on requests for packets were received throughout the remainder of FY 76 and filled to the extent allowed by available resource material.

Although recipients were requested to complete and return an evaluation form, most units failed to do so. Unofficial contacts with units and major headquarters revealed strong support for this project. In view of the manner in which these packets were produced and the large training audience reached, it is readily apparent that the project is worthwhile and cost effective.

LOGEX-Local 76. Continuing in the format of LOGEX-Local 75, early action in this project was initiated in April 1976 to identify the type units for which a Local Unit CPX could be developed for use at home station and to utilize profitably residual excess materials of the national exercise, LOGEX 76. This year FORSCOM advertised the availability of packets for 29 type TOE units. The requirements for packets exceeded 575. A significant improvement in LOGEX-Local 76 will be a more comprehensive set of guidelines to assist the unit commander in using the packets.

Combat Service Support Exercise 1976 (COSSEX 76). A team from the Training Exercise Division was provided to the 311th Support Brigade (USAR) for the period 20 July through 1 August 1975 at Camp Roberts, CA, with the mission of providing advice and consultative assistance to the brigade. The brigade's mission was to determine the feasibility of adapting the LOGEX 75 material into a combat service support exercise (COSSEX 76) for the Sixth Army area, scheduled for 10 through 24 July 1976. At the conclusion of the assistance trip, the Commander of the 311th Support Brigade recommended to the Sixth Army staff that the brigade conduct this exercise. COSSEX 76 was envisioned as a CPX with a single corps scenario in Korea in a short duration war. By capitalizing on the LOGEX 75 material, a tremendous savings in manpower would be accomplished while permitting a viable training device to be developed and conducted in the Sixth Army area.

A considerable amount of time and effort was expended on COSSEX 76 by LTB staff members in coordinating exercise planning requirements. Besides the onsite efforts, extensive work was accomplished to support the ADP requirements with data prepared at Fort Lee. In total approximately 170 man-days were devoted to COSSEX 76. On 12 November 1975, COSSEX 76 was officially canceled by HQ FORSCOM due to high priority exercise support requirements affecting many of the candidate player units.

#### Other Significant Actions

Heavy Equipment Driver Training Test/Study (HET). The USA Transportation School in coordination with this Center, was tasked by TRADOC to

conduct a Heavy Equipment Driver Training Study and Test. The objective of the study and test was to determine the most economical and feasible methods of training heavy equipment drivers.

Mobile Training Teams (MTT). An informal study was made on the Mobile Training Team activities in the four LOGC associated schools and outside activities such as Readiness Group, Fort Lee. The study found that training provided by Mobile Training Teams has been tailored to fit the needs of the unit requesting the training. Training has been conducted at Active Army, Army Reserve, Air Force, Air Force Reserve, and Marine Corps units in the United States and overseas locations throughout the world.

Education Telephone Network (ETN). On 25 July 1975, the Logistics Center was tasked by TRADOC to conduct a test to evaluate the capability of the Educational Telephone Network (ETN) teleconferencing system to provide cost and educationally effective instruction directly from service schools, or other sources to members of Reserve Components at geographically separate sites. The test was conducted from September 1975 through May 1976. The test addressed two different areas. First, it provided the data to evaluate the cost and educational effectiveness of ETN instruction, and second, it identified the key elements and managerial structure required to manage the ETN system on a routine basis. The test consisted of 12 separate ETN tests conducted by four service schools, four USAR schools, and a total of 14 National Guard/USAR units or instructional sites located in the 1st and 5th Army areas. Results of the test were briefed to MG Gorman at TRADOC on 11 June 1976. The LOGC recommended to TRADOC that:

- a. TRADOC accept ETN as a valid training mode.
- b. TRADOC appoint a permanent ETN Program Manager.
- c. TRADOC request DA assistance in seeking a teleconferencing policy for JCS and that the weekend policy in support of the present system be formalized.
- d. TRADOC task the service schools to identify courses suitable for ETN, and publish this capability in appropriate school catalogs.

MG Gorman approved the first three LOGC recommendations and deferred action on the fourth until further training requirements are identified. The final ETN test report was forwarded to TRADOC on 15 July 1976. The ETN Action Control Number, ACN 23605, was discontinued as of 30 July 1976.

Training Developments - Petroleum Glass Pipeline Training Aid.

Research by LTB revealed the requirement for an exportable model of the Petroleum Glass Pipeline Training Aid which is utilized by the Petroleum Department, US Army Quartermaster School, Fort Lee, Virginia. Exportable models would support an audience of over 100 personnel in each company of the five Reserve Component Petroleum Operating Companies covering MOS 76W, 92C, and MOS 4960. The LOGC submitted a request (in coordination with the QMS) to the Fort Lee TASO to construct a prototype exportable model of the training aid. TASO received approval from the Training Support Center to construct a prototype training aid subject to availability of funds. The prototype will then be tested and its training usefulness validated prior to construction of additional models.



## TECHNICAL RESEARCH SUPPORT

Air Movement Planning System (AMPS). This system is a computer program that provides a method for rapidly and efficiently planning and manifesting loads of Army unit equipment, personnel, and supplies for transport by USAF C-5, C-141, and C-130 aircraft. The program processes input data prepared and maintained by the Army unit, describing the cargo to be moved in detail adequate for load planning. The program is controlled by the characteristics of the aircraft being loaded and by parameters and options input by the unit or by the commander of the force being moved.

Before AMPS was implemented, earlier automation of aircraft load planning involved two DA approved systems: Computerized Airlift Planning System (CAPS) and the Automated Air Movement System (AAMS). CAPS matched unit movement data against a file of manually prepared type loads, and AAMS printed manifests of manually planned aircraft loads, using decks of punched cards prepared by units. The Department of the Army directed the old Continental Army Command (CONUS) to re-design AAMS for multi-command use on equipment of CS3, and for interface with CAPS. Joint testing of C5 aircraft developed a requirement for a system to both plan and manifest aircraft loads. The Automated Load Planning System (ALPS) was designed to fill this need. AMPS evolved from ALPS. AMPS incorporates all the features contained in ALPS plus enhancements developed during the testing of the ALPS system. The goal of the system is to provide to Army units with an air movement mission an automated method of preparing effective load plans for USAF aircraft that will provide a timely response within the dynamic environment of joint airlift operations. The system must be factual, accurate, make efficient use of aircraft, incorporate the commander's priorities, maintain unit integrity, and link trailers and/or crews to their respective vehicles.

In August 1974, the Logistics Center published the Users Manual for AMPS. During the first quarter of FY 75, the system was demonstrated at Fort Hood, Texas. Generally favorable responses were shown by most participants; however, Air Force representatives identified several areas where they desired some modifications. These modifications, and comments on them by FORSCOM and other participants at the demonstration, were analyzed by the Logistics Center in late 1974; and a program logic was prepared to determine the feasibility and practicality of the implementation. Following this analysis, a visit was made to the Military Airlift Command in order to discuss some practical alternatives. After agreement was reached, FORSCOM, TRADOC, and DA coordination was initiated in order to insure overall acceptance of the solutions suggested.

This resulted in several requests for further modifications by FORSCOM. Consequently, in July 1975, Colonel Jackson, Director of the LOGC Operations Analysis Directorate, went with Mr. McClosky of OAD and Mr. Saunders of the Transportation School to FORSCOM Headquarters in order to discuss FORSCOM's requests. This resulted in an agreement that the Logistics Center and FORSCOM would work jointly to achieve a system that would satisfy both FORSCOM and the Air Force.

During FY 76, two major actions were taken which related to AMPS. First of all, the AMPS system was modified to achieve a system that would satisfy changes requested by FORSCOM and the Air Force. These modifications were done by GSA contractors located in Huntsville, Alabama. They necessitated a revision of the AMPS user manual. Second, in coordination with FORSCOM (DCSLOG), a plan was developed for user unit training and testing for the evaluation of AMPS during the Brave Shield XV exercise in October 1976. During this exercise, Army units will prepare information on equipment and personnel to be airlifted. This information will be fed into a computer, along with information on aircraft, so that local plans for the designated aircraft can be generated. The plans will be used to load the actual aircraft flown during the exercise. FORSCOM and the Air Force will evaluate the results of this test.

The Logistics Data Base. The Logistics Data Base was utilized in support of a wide variety of users with the Army logistics community during 1974-76. During FY 76 alone, users included the 13th COSCOM, CGSC, the 3d Armor Division, the Quartermaster School, and the Missile and Munitions Center. Within the Logistics Center, the major users were analysts involved in SCORES, COGS, LOGEX, and the Planning Factors Management Office evaluations. From 1974 to 1976, the number of major reports produced using the Logistics Data Base System averaged around 300 per quarter. In FY 76, 317 Central Processor hours and 1,049 System hours of utilization were required on the TRADOC DPFO computer at Fort Leavenworth in order to produce these reports. This accounted for about 60 percent of the Central Processor time expended by the Logistics Center and 50 percent of the System hours.

The contractual effort to expand and improve the logistics Data Base that began in June 1975 continued through May of 1976. The first phase of this project was over 95 percent complete when the contract funds terminated in May; however, additional funding was received in June that provided for the completion of the improved system. Initial tests have indicated that the improvements made to the system will account for a 50 to 80 percent reduction in the utilization of the Central Processor time. Originally, implementation was planned for the late summer of 1976; however, this was delayed in order to allow for the completion of an additional effort that will add a scenario capability to the existing base. Implementation was rescheduled to begin in November 1976.

Manpower Authorization Criteria (MACRIT) Planning Factors Study (MPFS).

This study was prepared by the Organization Directorate's Requirements Division in conjunction with the Operations Research Division of the Operations Analysis Directorate. Technical assistance was offered by the Operations Research Division in the development of the study plan, questionnaire, and tasking directives to other organizations. Operations Analysis Directorate also provided key-punch support. Also, OAD personnel developed a plan of analysis and a master data file to use with the LOGC IBM 7094.

In the spring of 1975, a questionnaire was prepared which was designed to assemble comprehensive data concerning MACRIT. It was envisaged that the results of the survey would provide valuable information upon which to base decisions for determining Army manpower requirements. The questionnaires were sent to senior officers who had had experience during World War II and/or Korea. By 17 July 1975, enough questionnaires had been received--304--to establish a data base. Two substudies, one by the Ordnance Center and School on Indirect Productive Time and one by the Quartermaster School on Messing Factor and KP Factor, were received on 3 September 1975. They were included in the overall study as annexes. The completed MPFS was forwarded to TRADOC in January 1976. This evaluation of the amount of time nonsupervisory enlisted personnel spend on non-MOS tasks was computed utilizing the published UNIT MOVEMENT factors (AR 570-2). CACDA was tasked to study UNIT MOVEMENT factors; and that study, when completed, was to be a follow-on action to the MPFS. CACDA's findings will either validate the factors developed by the Logistics Center or will provide justification for modification. TRADOC was reluctant to accept the Logistics Center's original recommendations. A further recommendation was made to have the study forwarded to the Department of the Army for an Army Management review for elimination of extraneous functions. This comprehensive study, in three volumes, recommended the following factors be utilized for the development of TOE and other documents that deal with manpower requirements.

<u>CATEGORY TOE</u>	<u>AVAILABLE PRODUCTIVE HOURS PER YEAR</u>
I	1,490
II	1,710
III	2,020
III (fixed)	2,230

It should be noted that the above man-hour figures have been computed to exclude all non-MOS time such as security, casualties, unit movement, messing, kitchen police, work details, authorized leave and absences and personal needs. The time spent in unit moves was based on the current

published percentages (AR 570-2). These available productive man-hours may change (increase) when the study on unit movement is submitted by CACDA.

The following factors were utilized for computing indirect productive time for maintenance activities. Use of the maximum authorized factor is not mandatory.

<u>COMMODITY</u>	<u>FACTOR PER CATEGORY OF MAINTENANCE</u>		
	<u>ORG</u>	<u>DS</u>	<u>GS</u>
MISSILES	.44	.29	.29
SMALL ARMS	NA	.93	.93
ALL OTHERS	.56	.56	.22

Maintenance Task Demand (MTD) File: PHASE I. This study has as its primary objective "the creation of an automated data system for maintenance oriented modeling and simulation functions performed by this Center in support of combat development studies and analyses."<sup>1</sup> The system was to contain scenario identified maintenance data which describes in detail the maintenance resources required to maintain selected items of Army equipment. The idea of a maintenance task demand file originated with the Combat Developments Command Maintenance Agency. Its concept was embodied in a study proposal for detailed maintenance simulation in which the maintenance task demand file would be the primary input.

During August 1975, a draft PHASE I Study Plan was developed and revised based on review and comment from within the Logistics Center. Contractual support of the PHASE I study effort was initiated on 22 August 1975 by BDM Services Company, the TRADOC omnibus contractor. Two contractor personnel were relocated to the Logistics Center to initiate work on contract tasks.

An overview of the study was briefed to MG Graham and BG Vuley during the Operations Analysis Technical Review on 11 September 1975. On 16 September, the Project Officer was appointed by the Contracting Officer, Harry Diamond Laboratories, to be their representative. The first SAG meeting was held at the LOGC on 23 September 1975. Representatives attended from AMSAA, MMC, LOGC associated schools, and LOGC directorates with a direct interest. The Study Plan and Contractor's Work Plan were approved as amended. Operations Analysis Directorate provided the Chairman, Executive Secretary, and secretarial support for the SAG.

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<sup>1</sup> Ltr, ATCL-OS, COL Carroll, LOGC Chief of Staff, 17 November 1976, subj: Final Report on the Design, Development and Implementation of the Maintenance Test Demand (MTD) File System (Phase I).



Because of a shortage of manpower for this study, action was initiated with TRADOC to increase the scope of contractual support for the PHASE I study effort. This reduced the OAD manpower requirement for the third quarter of FY 76. In addition, study tasks were redefined to reduce further the OAD manpower requirement for the balance of the PHASE I effort. The revised study tasks and Contractor's Work Plan were approved by the SAG on 18 March 1976. An overview of the revised PHASE I effort was briefed to BG Vuley during the OAD Technical Review, 20 May 1976.

During FY 76, contractual support of the PHASE I effort continued on schedule with the completion of five out of eight contract tasks. Action was also taken to obtain TRADOC and DA review and approval of the contractual support requirements for proposed PHASE II and III efforts. The contractual support requirements were forwarded from TRADOC Headquarters to DA Headquarters by MG Vinson on 19 March 1976. At the requirements be processed under AR 18-1 vice AR 5-5. Revision of the contractual support requirements to comply with AR 18-1 was still in process at the close of FY 76. Phase I of the study was completed on 30 September 1976. This effort produced baseline user requirements, system specifications, software, and a single item data base for evaluation purposes. It was anticipated that Phase II of the study would be initiated during the first quarter of FY 77. This phase was to formalize the system and expand the data base to include additional items of equipment.<sup>2</sup>

Methodology for Correlating Combat Effectiveness with Logistic Support (CELOGS Methodology). Logisticians must consider a broad range of interrelated factors when determining the combat support capability of a particular unit. The transportation, supply, and maintenance systems impact on one another; administrative management and personnel resources compound the variables. It has become impossible to assess the logistics impact of these many intertwined factors with simply a pencil and calculator. The Army has, therefore, increasingly come to rely on computer simulations and models.

One of the most promising analytical tools being developed by the Logistics Center during 1974-76 was CELOGS, a study sponsored by TRADOC Headquarters. The study's purpose was "to develop a set of mid-level resolution logistic models which could be used to determine the impact of changes in logistic support on combat variables, and vice-versa, for a corps-size force."<sup>3</sup> The operational availability of end items, firing rates, mobility, and weapon density were the combat variables considered, while the logistics functions selected were supply of ammunition and bulk POL, maintenance, and transportation.

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<sup>2</sup>Ibid.

<sup>3</sup>Joseph G. Stenger, "New Tools for Logistics Planners," Army Logistician, 10, 4 (July-August 1978), p. 16.

On 2 December 1974, a concept paper which outlined a general approach for relating combat effectiveness to logistics support was submitted to General DePuy. The approach emphasized the conducting of analyses to determine the minimum logistics resources (in manpower and dollars) required to achieve various levels of materiel readiness and to meet consumption requirements in specific conflict situations.<sup>4</sup> Major General Graham, at the end of the month, endorsed a letter from MG Van Lydegraf of the Quartermaster Center and School to General DePuy on the implications of food-ration options in correlating logistics support with the combat effectiveness of a deployed force. On 7 January, General DePuy approved the LOGC approach articulated in the 2 December letter. In addition, the General agreed with MG Graham that the proposed study involved "a series of difficult analyses in areas not previously addressed successfully."<sup>5</sup> Brigadier General Richard H. Thompson, Director of Logistics Plans, Operations and Systems in DA ODCSLOG, likewise was enthusiastic about the study: "The long range goal of the proposed study may never be completely attainable because of many elusive characteristics of combat such as leadership, morale, and the vagaries of intelligence and target acquisition. However, any steps forward toward this goal will be valuable."<sup>6</sup>

During the next few months, members of the LOGC CELOGS team exchanged ideas and information with other Army agencies and contractors. On 27 May 1975, a draft study directive was finally completed and forwarded to TRADOC Headquarters for approval. This was obtained on 29 July. Phase I, "Research of the CELOGS Problem Area," was completed during FY 75/1.

The results of Phase I were considerable. Initially, the possibility was examined of logistic factors influencing the fire power potentials used in the Jiffy Game, the vehicle for evaluating combat effectiveness in the SCORES process. The Jiffy Game procedure, however, as employed by CACDA, proved insensitive to logistics inputs. An alternative

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<sup>4</sup> Operations Analysis Historical Feeder Report, FY 75/2.

<sup>5</sup> Cited in ibid., FY 75/3.

<sup>6</sup> Ltr, DALO-PLD, BG Richard Thompson to MG Graham, 6 December 1974, subj: An Approach to Relating Wartime Readiness and the Logistic Support Effort.

approach for CELOGS was to use the Concepts Evaluation Model (CEM) in conjunction with force round-out models such as the Battalion Slice Model, to provide a near term capability.

On 6 October 1975, General DePuy visited the Logistics Center and indicated that, while the link between combat operations, such as movement along the FEBA, and logistics effectiveness was of interest, it was not his primary concern at the time. The major question the General wanted answered was, "For incremental changes in the combat force structure, what is the impact on the logistic support factor?"<sup>7</sup> At the end of the month, MG Graham refined the CELOGS study by directing that it should concentrate on developing logistics models that relate logistics support to combat variables such as firing rates, weapon density, and mobility. A study plan which reflected this approach was forwarded to TRADOC Headquarters on 14 November.<sup>8</sup>

During the second and third quarters of FY 76, the CELOGS team developed small scale ammunition and POL models. These quick reaction models computed support requirements in terms of personnel and vehicles as a function of firing rates and POL consumption, respectively. In addition, a request for contract and statement of work for a maintenance substudy was to use the Maintenance Support Concepts (MASC) Model, which had recently been developed by the BDM corporation for the Ordnance Center and School. MASC was a mid-level resolution queueing model of GS, DS, and organizational maintenance support structures; it provided materiel operational availability as a function of the maintenance support provided. Extensions to the model were planned to be made through contractual effort, which would accommodate the analysis of varying float sizes and current maintenance concepts, such as COGS.

By the fall of 1976, additional ammunition and POL models which considered more factors and had more capabilities were completed. The improved ammunition model considered time-phased buildup of forces, stockage policies, loss factors, and the existence of prepositioned stocks. The improved POL model determined the bulk POL requirements for each geographic area and computed the quantity of a specified delivery

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<sup>7</sup> Cited in Operations Analysis Historical Feeder Report, FY 76.

<sup>8</sup> Ltr, ATCL-O, COL George A. Lynn, Director, Operations Analysis Directorate, to Commander, US Army Training and Doctrine Command, 14 November 1975, subj: Methodology for Correlating Combat Effectiveness with Logistic Support (Short Title: CELOGS Methodology), ACN 22899 (with two inclosures).

system, the cost of the delivery system and the manpower required. Alternatively, the model utilized an integer linear programming algorithm to determine the optimum delivery system for each link of the transportation network, by minimizing either cost or manpower.

Consolidation and Management of Supply Consumption Rates (COMSCOR). This study is an outgrowth of a 1973 study by the Logistics Management Institute (LMI) at the direction of the Assistant Secretary of Defense, I&L. The purpose of the LMI study was to develop criteria and methodology for establishing and managing valid Army planning factors of the type contained in FM 101-10-1. The major result of the LMI study was the recommendation that a single Army activity be vested with the responsibility for the development, maintenance, update, and dissemination of Army planning factors. The Institute also recommended that the Army conduct an implementing study for the establishment of such an office. This study became known as COMSCOR.

On 4 June 1974, the Department of the Army tasked TRADOC to develop a plan for implementing the recommendations contained in the LMI study. TRADOC, in turn, on 1 October 1974, designated the Logistics Center as the study proponent and directed that a Study Advisory Group be established to provide guidance as required and to review the study effort. Three days later, the SAG convened for the first time in the Conference Room of Larkin Hall, Fort Lee, Virginia. The purpose of the meeting was forwarding the plan to ODCSLOG for approval. The final Study Plan was forwarded to DA Headquarters on 13 November. It was approved on 23 December, with one major exception. The Department of the Army directed that the Planning Factors Management Office (PFMO), when established, be located at the Logistics Center in view of its capabilities and its predominate role in the application of planning factors to the Army in the field. On 1 July 1975, because of immediate need, TRADOC directed the Logistics Center to establish a provisional logistics PFMO to develop logistics baseline planning factors as an interim measure. Eight days later, the provisional office was officially established, and the COMSCOR SAG was directed to provide supervision and guidance in order to insure continuity of effort.

On 19 December 1974, a preliminary list of potential users of supply planning factors had been forwarded to each SAG member for review and comments. This had been done in accordance with tasks one and two of the Study Plan. All responses had been returned by the end of the following January, and the list was revised accordingly. Organizations on the list were requested to identify current and proposed supply planning factors and sources and uses of these factors. To that end, a questionnaire was prepared and distributed early in the spring of 1975. Preliminary findings from the questionnaire were presented to the SAG on 16 July 1975.



At this second SAG meeting, several members recommended that the PFMO should concern itself with all logistics planning factors rather than just supply planning factors as required by the study plan. This recommendation was approved by the SAG. The DAODCSLOG member concurred with the provision that the supply planning factors would remain the first priority. On 11 September 1975, at a project review meeting, the LOGC Commander indicated that, since the COMSCOR study team had already prepared the groundwork for the PFMO, and the provisional PFMO had been established, no further research was required. The Command then recommended that the final report be completed and a fully operational PFMO be established without delay.

Meanwhile, the findings from the questionnaires had been analyzed and documented. The report was then staffed internally and, on 26 February 1976, forwarded to all SAG members for their review and comments. Comments were received during the fourth quarter of FY 76 and were incorporated into the final study, which was forwarded to TRADOC and DA DCSLOG. Two basic recommendations resulted from the COMSCOR Study: (1) that the technical and functional requirements delineated in the study serve as the basis for further development of the PFMO, and (2) that the interim and projected staffing, proposed for the PFMO, be approved and implemented through personnel authorizations for the positions identified.

Modeling Support for Determining Base Area Support Degradation During Forward Area Refueling and Rearming Point (FARRP) Deployment. During 1974-75, a methodology was prepared by personnel within the Operations Analysis Directorate for determining the degradation of base area support when a FARRP is deployed. A key element of the methodology was an equation that was programed for the WANG Calculator System to determine readily the effect of changing any of ten input variables on the number of man-hours remaining in the base area. This equation was used by OAD and C&D Directorate personnel to conduct parametric analyses of operational, personnel, and service factors. The final report of the analysis was sent to the Department of the Army Headquarters in April 1975.

Economic Analyses. One of the most important ongoing actions of the Operations Analysis Directorate is the development of an Economic Analyses in support of projects and studies in which the Logistics Center is involved. Presented below is a list of some of the significant Economic Analyses which were being developed by Operations Analysis personnel during the period which the historical report covers:

1. Standard Army Maintenance System.
2. Visibility of Intransit Cargo (VIC) Phases II and III.
3. Standard Army Ammunition System (SAAS) Level 3.
4. Standard Army Intermediate Level Supply System (SAILS), B Depot Level, at Prototype Test.

5. Standard Army Maintenance System.
6. Automated Interchangeable/Substitutable (I&S) System Change Request (SCR) to the Division Logistics System (DLOGS).
7. Educational Telephone Network (ETN) Test Program.
8. AN/TSQ-73 Maintenance and Repair Parts Supply Concepts.
9. Direct Support Unit Standard Supply System (DS4).
10. Standard Property Book System (SPBS).
11. Standard Army Intermediate Level Sub-System Level AB(X).

## XI

### OTHER SIGNIFICANT ACTIONS (FY 76)

Family of Military Engineer Construction Equipment (FAMECE). Mr. Cohen, Materiel Directorate, participated in the quarterly TIWGS to assist in OTEA test planning and support. In February 1976, the Product Manager formed an Integrated Logistics Support Management Team (ILSMT). The Engineer School and the Logistics Center participated in this endeavor. The FAMECE Initial Draft Equipment Publications and Maintenance Allocation Charts were reviewed, and the TRADOC coordinated input was forwarded by the Logistics Center to the Product Manager in July 1976. Also, in FY 76, the Logistics Center worked with the Engineer School and the Armor and Engineer Board to formulate a RAM field data collection program. The Engineer School worked with the Logistics Center, too, to conduct a study of RAM data from IPT reports on those items of equipment which the FAMECE work modules are envisioned to replace.

Mortar/Artillery Locating Radar (MALOR). During FY 76, an ambitious effort was initiated to expedite fielding of these two radar systems. The AN/TPQ-37, the larger and more complex of the two, went through DT/OT I testing on prototype developed by Hughes and Sperry contractors. A Source Selection Evaluation Board was established along with a Source Selection Advisory Council to evaluate and select the prime contractor. Hughes was awarded the contract in May 1976 to continue development of the AN/TPQ-37. The company is also the prime contractor for the AN/TPQ-36.

Printed Circuit Board Repair (PCBR). In February 1975, the Department of the Army issued a policy letter on field repair of printed circuit boards (PCB) which required major commands to develop and retain an organic general support maintenance capability to support C-E equipment, cards, and modules. Accordingly, the Logistics Center initiated a review of ongoing activities in the field of PCB repairs and concepts. This review culminated in development of a draft letter requirement (LR) which was sent to TRADOC Headquarters in August. TRADOC returned the draft LR with instructions to include a BOIP and initial appraisal. The revised draft LR was resubmitted to TRADOC Headquarters in April 1976 and, at the end of the fiscal year, was being coordinated with major commands for comment and approval.

Realignment of Supply Activities (RASA). Initiated in March 1975, this study had the objective of realigning doctrine and organization for the general support of Class I, II, IV, and III packaged supplies in concert with the COGS concept. The Quartermaster School was the proponent. Employed in the TAACOM or corps area, the General Supply Center developed

by the study can be easily tailored to serve less than its capacity of two divisions per corps. Augmentation allows service of up to 93,000 troops, but an additional center is recommended when that strength is approached to avoid the concentration of stocks and lateral distribution of supplies. Perishable C1 I support will be provided by augmentation when directed by the command. The RASA study was forwarded to TRADOC on 30 April 1976. The resultant field manual is FM 29-113.

Missile Materiel Center, GS (MISMAC). Begun in August 1975, this study was developed at the Missile and Munitions Center and School using the COGS model as a precedent. Existing deficiencies of the current system, which requires five TOE to provide general support to missiles, are to be eliminated in the TOE of the MISMAC. The TOE can be expanded, however, to match the needs of a given force while facilitating manpower conservation. The MISMAC advantages are several. Efficiency and supply support are increased by the concentration of technical expertise at the MISMAC; this allows easy classification of missile peculiar repair parts and components turned in by DS units. There is one-stop supply and maintenance for the DSU. Better control of resources by the commander is possible with a center concept, which also fosters MOS training and cross-training by the concentration of skills. Piece-part/printed circuit board repair capability is introduced by the MISMAC, reducing intransit time and theater stocks. Onsite repair and contact team assistance to user and DS units by the MISMAC minimizes DS overflow to the GS level, keeping repairs forward and increasing readiness posture. TI/QC will contribute to quality products and services. Approval of the MISMAC concept is contingent upon the status of COGS. The resultant field manual is FM 9-53.

Transportation Aviation Supply Support System (TAS3). A study by the US Army Transportation School incorporating the three levels of aviation maintenance was submitted in April 1976. The study was approved as a reference for the development of an aviation materiel center. In the COGS manner, the development would provide sufficient maintenance and supply detail to guide the establishment of a center to support Army aviation.

Proposed Materiel Handling Equipment Authorization for Application to Organization in the Army in the Field. The primary purpose of this staff study was to provide authorization criteria for forklifts in AR 310-34 for application to Army in the field TOE/MTOE. Research on the subject found the criteria to be nonexistent. A proposed revision to paragraph 4-27 (current criteria for TDA application) in AR 310-34 was recommended. The study emphasized the MHE requirements in support of container operations in the theater as outlined in the AFCSS study and forklift requirements needed to support the DSS concept/doctrine. The study was forwarded to TRADOC for review.



Other Significant Actions of the Organization Directorate. A total of 94 TOE were reviewed and completed during the fiscal year. Fifty-six Basis of Issue (BOI) actions and 36 QQPRI (Qualitative and Quantitative Personnel Requirements Information) were completed during the fiscal year.

Exercises. Between July 1974 and September 1976, the Logistics Center participated in ten exercise planning conferences. Two of these were the semi-annual conferences conducted at the US Readiness Command (USREDCOM) in which projected future exercises were discussed. In the other conferences, held for specific exercises (e.g., SOLID SHIELD 76, ORBIT PHANTOM I and II), the Logistics Center contributed logistics data and information for incorporation into the exercise scenarios. After the planning sessions were completed, LOGC personnel observed the exercises (CABER WARRIOR III, September 1975; ORBIT PHANTOM I, December 1975; JACK FROST 1976, January 1976; CABLE CUTTER I, February 1976; BOLD EAGLE 76, February 1976; SOLID SHIELD 76, May 1976; BRAVE SHIELD XIV, August 1976), participated in the logistics seminars and after action discussions, and provided interim reports of logistics observations to the Logistics Center and associated schools. In addition, when the exercise headquarters published the final after action report, copies were distributed within the Logistics Center and associated schools, as appropriate. The reports indicated problem areas highlighted by exercise personnel which had not been resolved during the exercise and required subsequent action.

Force Development Testing and Experimentation (FDTE). Work was begun in October 1975 to develop a methodology for conducting an evaluation of Combat Oriented General Support (COGS), later renamed Restructured General Support (RGS). The initial action involved the development of an Outline Test Plan (OTP). After discussions with all interested LOGC directorates, the purpose, objectives, and scope for a test at Fort Hood, Texas, were determined and briefed to General Graham. After the LOGC Commander's changes were incorporated into this OTP, representatives of the Ordnance School, Transportation School, and the Logistics Center met with MASSTER (now TCATA) and 13th COSCOM personnel at Fort Hood on 2-5 December 1975, in order to initiate formally the test planning process. The results of this meeting were briefed to General Graham on 18 December 1975. He directed that alternative evaluation techniques be examined which would include evaluating the COGS concepts (1) in a CPX using elements of a COSCOM, (2) in SCORES, (3) in a simulation model, and (4) in a field test with one or more centers in Korea. These alternatives were evaluated, and in February 1976 General Graham was briefed on the results. After considering this report as well as others, General Graham advised General DePuy of the procedures which would be utilized to evaluate COGS. In April 1976, the TRADOC Commander

approved the LOGC Commander's approach. The remainder of the year was spent implementing the actions contained in the February 1976 letter.

Concurrent with the COGS action, another major project during this period was that associated with Project CAR (Corps Automation Requirements). In addition, LOGC personnel from the Evaluation and Test Directorate monitored the LOTS pre-test (i.e., Heavy Lift Break Bulk Test) which was conducted at the Transportation School, participated on the REDCOM transportation evaluation team of REFORGER 76, and provided input and review to approximately six other FDTE projects, including the Water Purification test and the CEWI Support Concept.

TRADOC Theater Level Standard Scenario. In August 1975, TRADOC tasked the Logistics Center and the Combined Arms Center Development Activity to help develop the Theater Level Scenario. This scenario will provide a common framework of selected situations and real world conditions in which specified US forces are employed. The scenario will war game combat and logistics operations and confirm or recommend changes in doctrine, organization, material, and/or force structure. On 13 November 1975, LTC Lybarger, Evaluation and Test Directorate, and LTC Wiersmer, Concepts and Doctrine Directorate, visited the Concepts Analysis Agency (CAA) at Bethesda, Maryland, to participate in discussions designed to solidify the required Theater Level Scenario requirements and evaluation methodology. During the conference, a copy of the Theater Level Scenario guidance developed by TRADOC was distributed and discussed. Each agency at the meeting presented briefings on their requirements and capabilities. The Concepts Analysis Agency briefed on the Force Analysis Simulation of Theater Administrative and Logistical Support Model (FASTALS), the Concepts Evaluation Model (CEM), and the results of two recent European Theater Level Force Analysis projects called WARSCAP and OMNIBUS. Milestones were also scheduled for the coming year.

On 25 February 1976, the Force Analysis Division of the Evaluation and Test Directorate conducted a SCORES workshop primarily for the Logistics Center associated schools. During this workshop, Colonel Lybarger presented a briefing which covered the salient plans and decisions made up to that time on the Theater Level Scenario. Lieutenant Colonel Akin, CAA, briefed the group on the general missions of the CAA and, in particular, the employment of the FASTALS model to round out combat service support units in the theater force. It was determined that the Logistics Center and its associated schools should be represented in a forthcoming workshop to be conducted at the CAA, which related to interpreting the FASTALS output.

During the week of 15-19 March 1976, Colonel Lybarger briefed CACDA on the current status of the Theater Level Scenario. On 24 March, the

Logistics Center distributed copies of the FASTALS User's Guide to the associated schools, CACDA, TRADOC, and the US Army Administration Center, and the US Army Communications Command. The following day, Colonel Lybarger visited Fort Monroe and briefed MG W. H. Vinson, Jr., DCSCD, and Lieutenant Colonel Hunter of the Combat Development Planning Group. By the end of the month, final lists of supply consumption factors and levels of unit commitment were provided to CAA in preparation for an initial "confidence" run of the FASTALS model. The first computer "run" of the FASTALS model which utilized TRADOC input was performed by the CAA on 26 March.

The CAA workshop on FASTALS proceeded as scheduled on 27-29 April 1976. At this workshop, instruction was given in the interpretation of computer output data. All attendees were presented with the FASTALS developed theater. The results of this analysis culminated in a LOGC workshop held on 22-23 June, wherein all schools presented their insights gained from the analysis. Phase I of the Theater Level Scenario development ended on 30 June 1976. During FY 7T, Phase II actions were developed. These consisted primarily of providing data to the CAA for updating the FASTALS model input and of completing the stockage objectives for the theater scenario.

Project CAR (Corps Automation Requirements). Echelons Above Division doctrine dramatically expanded the role and mission of the corps. A corps which was essentially a tactical organization was transformed by the doctrine into one with total combat, combat support, and combat service support responsibilities. The corps commander became charged with the responsibility for logistics and administrative operations carried out through the use of the Corps Support Command (COSCOM). In effect, the corps became a self-sustaining entity, assuming CSS functions formerly performed by the field army. As EAD concepts evolved, it was realized by the Department of the Army that the centralized corps automation requirements projected by the concepts exceeded the processing capability of the single mobile computer configuration identified with the then corps level Combat Service Support System (CS3). Thus, in late 1974, Project CAR was approved as the vehicle through which automation of corps logistics and administrative management system requirements would be accomplished in an orderly, systematic, and evolutionary manner.<sup>1</sup>

This perception was brought into sharper focus with the assignment of responsibilities incident to Project CAR by the Chief of Staff of

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<sup>1</sup> Ltr, no office symbol, Lieutenant General Ralph E. Foster, Director of the Army Staff, to Commander, TRADOC, 11 November 1974, subj: Corps Automation Requirements (CAR).



the Army. The Director, Management Information Systems (DMIS) became the project proponent. The US Army Training and Doctrine Command, as the Army's combat developer, was charged to develop a management information system (MIS), an automatic data processing support concept (less tactical data systems) that would provide a frame of reference against which corps automation requirements can be evaluated. In May 1975, the Army Chief of Staff officially designated the US Army Logistics Center as the TRADOC proponent for the evaluation of the Corps Hardware Plan solution to CAR and tasked the LOGC to conduct a comparison of the Corps Hardware Plan and the Economic Analysis of the Direct Support Unit Standard Supply System. This additional analysis was thought necessary before modification or validation of the Corps Hardware Plan Concept could be recommended.<sup>2</sup> However, at a conference held at the Logistics Center on 25-26 June 1975, the participants agreed that a direct comparison of the two studies could not be validly or profitably made. Instead, it was determined that the most logical and effective alternative was to conduct a comparative analysis of the DS4 and the DSU portions of the Corps Hardware Plan.<sup>3</sup>

In the spring of 1976, the Department of the Army prepared another tasking letter which charged TRADOC to accomplish certain specific actions during FY 76. These included the admission of a Phase I OTP to support Project CAR baseline FDTE testing, designating an Assistant Test Director, preparing a milestone schedule for the accomplishment of a MIS-ADP Support Concept for the corps, and detailing a program consistent with previous guidance for inclusion in the FY 79-83 POM.<sup>4</sup> Since the Logistics Center was the TRADOC proponent for Project CAR, it was made responsible by TRADOC Headquarters for accomplishing these tasks. Originally, it was decided to have Systems Design be the "lead directorate" for Project CAR actions;<sup>5</sup> however, subsequent guidance by BG Vuley (who became the Assistant Test Director) resulted in the establishment of the LOGC Project CAR office within ODCSOPS in March 1976. It became a separate office under the Chief of Staff in August 1976, with Colonel W. E. Whelan as Chief and two systems design personnel as his staff.

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<sup>2</sup>Ltr, no office symbol, Office of the Chief of Staff, DA, 23 May 1975, subj: Corps Hardware Plan.

<sup>3</sup>Ltr, ATCL-SCC, COL William S. Bice, Director, Systems Design, 8 July 1975, subj: Corps Automation Requirements (CAR).

<sup>4</sup>Ltr, DACS-DIF, Lieutenant General Foster to Commander, TRADOC, 31 March 1976, subj: Project CAR (Corps Automation Requirements). An earlier draft of this letter had been given to the Logistics Center for comment about a month and a half previously.

<sup>5</sup>DF, ATCL-DPE, LOGC Chief of Staff to Director, Systems Design, 23 February 1976, subj: Project CAR.



## XII

### EPILOGUE

On 1 March 1977, the Logistics Center historian had the opportunity of interviewing MG Graham, the Logistics Center Commander, and asking questions on a wide range of topics relating to logistics and to the Center. Among the questions asked was "What lies in the future for the US Army Logistics Center?" MG Graham's answer provides a fitting epilogue to this history:

General Fuson, when he ran the Transportation School, complained repeatedly that there was no valid description anywhere of the Army logistics system. That was a valid comment. There wasn't just the lack of a document but of a community acceptance of what the system ought to be. You had unique solutions to problems in every command in the world. And you couldn't train a man to serve in the Army because it depended on where he was going.

I think we have overcome this to a great degree in the last four years. The community is talking among themselves in an intelligent way, and logistic doctrine is being applied throughout the world in a standardized fashion. And the books which have been published on the logistics system as field manuals--the chapter in 100-5 and 54-10 haven't been published yet--describe, not just the Logistics Center's progress, but the consensus of the community as to what the logistics system in the Army should look like. We didn't know in 1973 what ADP applications were needed. We had a bunch of fragments and a whole bunch of systems and people were working on them as individual projects; and we had a host of command uniques all over the world, and nobody knew what was in them except the people running them--and they didn't know very well. Partly, that was because there was no understanding of the total system of logistics which the ADP is a management tool to support.

Now we have progressed to the point where the description of the system is generally accepted by everyone as the way we ought to do things. And the ADP systems that are needed to support the management of that are mostly designed--not all yet deployed, but mostly designed--and in the process of deployment. Along with this the career development of people and their MOS structure has been worked out in concert with the doctrine. OPMS and EPMS provide the skills for individuals which are

needed to operate the system, and TOEs are being continuously improved, modified, and changed to facilitate the management of the system as described. We are testing many of the applications in a professional manner, in writing exercises and training units and every day getting more professional and getting the reserve components bound into the total Army, working with the reserve components and the FORSCOM command in this direction.

You cannot do these things overnight. But the roadmap of what we are doing, why we are doing it, and the priorities of how to get there are pretty clearly defined now; and they were not three years ago. That is the primary accomplishment of this Center.

## APPENDIX

### THE BUILDING OF SOMERVELL HALL

The planning for the Somervell Hall facility began in the spring of 1973 and included preparation of the DD Form 1391, a Design Criteria Data Check List, and general and detailed site plans. Coordination was initiated with Installation Facilities Engineers and AAFES personnel on the cafeteria for the building. DD Form 1391 was prepared on 12 April 1973 and officially submitted thru CONARC - DA - DOD to the Office of Chief of Engineers (OCE) on 3 May 1973. The document requested \$7,245,500 in the FY 75 federal budget for construction of a 186,000 square foot building for the Logistics Center at Fort Lee, Virginia. Space was to be allocated for such administrative support facilities as a library, cafeteria, war-gaming room, auditorium, and a number of conference and group work rooms. In July 1973, an Environmental Impact Assessment was prepared. On 16 October 1973, the project officially became a MCA authorized project on the TRADOC MCA FY 75 program with a priority of 71A in a total of 138 priorities.

Once the building obtained a degree of priority at the Department of Defense, OCE and DCSLOG (I&L) became the LOGC's primary project team before Congress. Meanwhile, the Logistics Center was mobilizing local and state political support for the building. Local politicians and the DCSLOG lobbied with the Senate to approve the measure. That political support proved to be of great value when the House Appropriations Committee turned down the administration building in October 1974. After the Senate approved a reduced monetary version, a compromise was worked out by a joint House-Senate Committee of conferees and on 17 December 1974, the LOGC Administration Building was approved and funded as a part of the MCA FY 76 construction package (funded FY 75 appropriations).

While efforts were being made to procure Congressional authority and appropriations to construct the new building, the Technical Advisor's office, in conjunction with the Norfolk District, Corps of Engineers, began a detailed design of the proposed facility. On 4 June 1974, the pre-design conference was held at the Logistics Center attended by representatives of the LOGC, CSCSG, District Engineers, Fort Lee Facilities Engineers, and the architectural engineer (AE)--Odel Associates, Inc. of Charlotte, North Carolina. During the period June 1974-November 1974, there was continued coordination between the user (LOGC), engineers, and architects via a series of short workshops and telephone conversations. From these several trial building plans emerged.

Anticipating a Congressional reduction in appropriations and an inflationary market, the Norfolk Engineer District recommended that the Logistics Center begin making plans for a reduction in the scope of the

building from 186,000 to 100,000 square feet. As a result, the LOGC commander, in consultation with CSCSG and the installation commander, decided to drop the computer room, war-gaming room, OAD, LOGEX, and all but 100 spaces of CSCSG from the building. On 5 December 1974, a conference was held at the LOGC to redefine the scope of the building and establish future directions, priorities and milestones. The AE was instructed to redesign within a funding limitation of \$5.6 million actual construction cost. Pending Congressional approval and funding, the Corps of Engineers took the unusual action of completely short-circuiting standard design procedures and proceeded to design a final product which would be ready for construction by the summer of 1975. Concept presentations were waived, and much of the review and analysis was expeditiously accomplished. This caused the AE to be on a very tight schedule, but all milestones were met. The AE was instructed to design the structure in modular form to accept additives.

At a design conference on 9 January 1975, one of the major problems which was discussed was the uncovered center court included in the design of the building. The District Engineers were hesitant to give the final approval to this plan. There were indications that the District's objections to the courtyard resulted as much from fear of adverse reaction to such a "luxury" item as concern over the actual cost. On 14 January 1975, the architect contacted the Army Corps of Engineers concerning the courtyard. Based on a preliminary cost analysis, the architect was allowed to continue with the development of the atrium.

At the 25% design conference held on 13 February 1975, several problem areas were discussed and numerous decisions were made:

a. Fort Lee Facilities Engineer wanted the AE to look at the use of bricks as an alternative exterior surface to precast whitened concrete slabs. It was his contention that the LOGC building would be the "odd man out" because it would not fit into the pattern of brick structures now existing at Fort Lee. The Logistics Center defended its decision to have a modern, picturesque building, and Norfolk District agreed. The AE advised that a hasty estimate indicated that brick was much more expensive. At the insistence of the Fort Lee Facilities Engineer, the AE was instructed to make a formal analysis to compare the cost of brick vs concrete surface. During the latter part of February 1975, much research was accomplished on the technical and economic considerations of both types of surfaces. After a meeting between the LOGC commander and the Installation commander, it was decided that the precast concrete slabs would be utilized.

b. The LOGC requested an answer to a 29 January 1975 letter which asked that utility service lines to the building be examined to insure adequate support for the structure currently under design and for any



future expansion. The Engineers were unable to state that utilities were adequate; further investigation was required.

c. The barber shop was deleted to provide for a drafting room and office space.

On 15 April 1975, the architectural firm of Odel Associated delivered a completed design to the Norfolk District, US Army Corps of Engineers. Preliminary reviews were completed by 30 April and final approval was given by the Corps of Engineers during the first week in May. Bid invitations were mailed on 15 May 1975.

On 21 April 1975, the Logistics Center began its campaign to retain the elevator included in the original design. The DOD Construction Criteria Manual 4270.1-M stated that unless otherwise required for particular functions, passenger elevators should not be provided expressly for the physically handicapped. Further, OCE Guide specifications stated that in 2-4 story structures, elevators will be installed only where directed. Since an elevator was not programmed on the DD Form 1391, the Norfolk District Engineers would not support the requirement. Feeling very strongly that an elevator was a bona fide requirement for transporting freight, and more importantly, for handicapped personnel, the LOGC requested information and support from the State Department of Vocational Rehabilitation. That agency responded with enthusiasm and timeliness and provided much information on state and federal laws. In addition, contact was made with the President's Committee on Hiring the Handicapped. After a considerable amount of coordination and work from the Logistics Center up to the Office of the Secretary of Defense and the President's Committee on Hiring the Handicapped, the Logistics Center received an Advice of Authorization and/or Allotment dated 8 September 1975, which authorized the installation of an elevator in the new facility.

There were five general officers proposed by the historian for whom to name the new structure: MG James G. Harbord, MG Everett Strait Hughes, GEN Leroy Lutes, LTC Wilhelm D. Styer, and GEN Brehon Burke Somervell. The resumes' of these general officers were reviewed by an ad hoc committee and a recommendation made to MG Graham. The Commanding General concurred with the recommendation of the committee, and machinery was put into motion to obtain approval to name the new structure after General Somervell, head of the Army Service Forces during World War II. Contact was made with General Somervell's family; and, on 11 May 1975, Mrs. W. S. Brenza, eldest daughter of GEN Somervell, conveyed the family's pleasure in having such a structure named after her father. On 27 August 1975, the Logistics Center requested approval of the Post and approval was granted on 7 November 1975.

"Bid opening day" was 4 June 1975, and the LOGC made a representative available. The contract was awarded to Kenbridge Construction Company for \$3,451,085. Uncommitted funds in the amount of approximately \$2.5 million were a result of the fluctuation in the US economy during the previous 12 months. Construction costs were at a peak in January 1975 when the hard decisions were made on size, structure form, and scope of the building. At the request of the Logistics Center, the Norfolk District Engineers immediately contacted the OCE and requested retention of the balance of the Congressional appropriation for construction of an addition to the building to meet the stated initial requirements. On 5 June 1975, the Norfolk District advised the LOGC that authority had been granted to build up to the originally requested 186,000 square feet and spend the entire appropriated amount of \$6,245,500. On 17 June 1975 the first pre-design conference on the building addition, known as Phase II, was held and construction began on Phase I on 2 July 1975.

As soon as the bids were opened and an apparent low bidder selected, LOGC personnel began preparing for the groundbreaking ceremony. Invitations were set out in mid-June 1975 for the ceremony to be held on 1 July 1975, the anniversary of the founding of the Logistics Center. Arrangements were made for the Army band, ceremonial tent, and color guard, and the programs were published; however, because of a series of untimely incidents, the hospitalization of the LOGC commander and a very compressed time schedule, the groundbreaking ceremony was not held and the contractor began actual construction.

In August 1975 the LOGC Commander corresponded with the Norfolk District Engineer and expressed his concern over the schedule for Phase II. The contract award was not scheduled until April 1976, but the construction market at the time was favorable for low bidders. The District Engineer assured the commander that every effort was being made to take advantage of any condition that might improve the schedule of completion. The concepts review for the design of Phase II was held on 25 September 1975. The purpose of the review was to analyze the documents of the concept phase, and, upon approval of concepts, proceed with the final design. The purposes of the review were accomplished. The invitations to bid were sent out on 12 January 1976; and, on 4 March 1976, the LOGC provided a representative to the bid opening. There were 3 additives to the base bid: (1) replacement of an existing storm sewer along 38th Street; (2) widening and signalization of intersection at 38th and A Avenue; and (3) additional cost for providing carpeting in lieu of vinyl tile in open bays in Phase I. The LOGC was very pleased when the Norfolk District Engineers announced that Kenbridge Construction Company (contractor for Phase I) was the apparent low bidder, since there were many obvious advantages to having only one contractor working at the construction site. The contract for Phase II was awarded to Kenbridge Construction Company on 11 March 1976, and they were provided notice to proceed on 2 April 1976.

## ACRONYMS AND ABBREVIATIONS

### A

AAH	Advanced Attack Helicopter
AAMS	Automated Air Movement System
AAO	Authorized Acquisition Objective
ACCB	Air Cavalry Combat Brigade
ACSFOR	Assistant Chief of Staff for Force Development (DA)
ADSAF	Automatic Data Systems within the Army in the Field
AESRS	Army Equipment Status Reporting System
AFARV	Armored Forward Area Rearm Vehicle
AFCSS	Army in the Field Container System Study
AFIS	Army Force Integration Study
ALOC	Air Line of Communications
ALPS	Automated Load Planning System
AMIS	Army Management Information System
AMPS	Air Movement Planning System
ANSI	American National Standards Institute
ARR	Army Readiness Region
ARRS	Aircraft Refueling and Rearming System
ARTEP	Army Training and Evaluation Program
ASL	Authorized Stockage List
ASP	Ammunition Supply Point
ASPR	Anti-Armor Systems Program Review
ATE	Automated Test Equipment
ATSS	Automated Test Support Systems

### B

BASOPS	Base Operating Information System
BOI	Basis of Issue

### C

CAA	Concepts Analysis Agency
CABL	Consolidation of Administration at Battalion Level
CACDA	Combined Arms Combat Development Activity
CAMMS	Corps Automated Maintenance Management System
CAPS	Computerized Airlift Planning System
CAR	Corps Automation Requirements
CATB	Combat Army Training Board
CELOGS	Combat Effectiveness with Logistics Support
CFA	Covering Force Area

CHITO	Container Handling in Terminal Operations
CMF	Career Management Field
COEA	Cost and Operational Effectiveness Analysis
COGS	Combat Oriented General Support
COILS	CONUS Installation Logistics Support
COMSCOR	Consolidation and Management of Supply Consumption Rates
COMSECLOG	Communications Security Logistics
CONAM	Concept of Night Aircraft Maintenance
COSCOM	Corps Support Command
COSRRIB	Combat System, Rearm/Refuel in Battalions
COSSEX	Combat Service Support Exercise
CPIF	Cost-Plus-Incentive-Fee
CPX	Command Post Exercise
CS3	Combat Service Support System
CSA	Corps Storage Area; Chief of Staff, Army

#### D

DAMMS	Department of the Army Movements Management System
DASPS	Department of the Army Standard Port System
DCSLOG	Deputy Chief of Staff for Logistics
DDC	Division Data Center
DFAC	Dining Facility Center
DFS	Detailed Functional System Requirements
DISCOM	Division Support Command
DLOGS	Division Logistics System
DLOS	Division Logistics Organization Structure
DRS	Division Restructuring Study
DS4	Direct Support Unit Standard Supply System
DT	Development Testing
DX	Direct Exchange

#### E

EA	Economic Analysis
EAD	Echelons Above Division
EASI	Expanded Skill Identifiers
EES	Enlisted Evaluation System
EPMS	Enlisted Personnel Management System
EQUATE	ECOM Quality Assurance Test Equipment
ETN	Education Telephone Network

#### F

FAMECE	Family of Military Engineer Construction Equipment
FARRP	Forward Area Rearming and Refueling Point



FASCO	Forward Area Support Coordinator
FASTALS	Force Analysis Simulation of Theater Administrative and Logistical Support
FDTE	Force Development Testing and Experimentation
FVT	Field Validation Test

G

GFSR	General Functional System Requirements
GTV	Ground Test Vehicle

H

HET	Heavy Equipment Transporter
HIMO	High Mobility (Vehicles)

I

ILS	Integrated Logistics Support
IPR	In-Process Review
ITDT	Integrated Technical Documentation and Training

L

LEADER	Logistics Echelons Above Division in USAREUR
LCSS	Land Combat Service Support System
LEA	Logistics Evaluation Agency
LOA	Letter of Agreement
LOAC	Logistics Officer Advanced Course
LOGCAB	Logistics Center Advisory Board
LOGEX	Logistics Exercise
LOI	Letter of Instruction
LOTS	Logistics Over the Shore
LRP	Long Range Plan

M

MAC	Military Airlift Command; Maintenance Center; Maintenance Allocation Chart
MACRIT	Manpower Authorization Criteria
MALOR	Mortar/Artillery Locating Radar
MASSTER	Modern Army Selected Test Evaluation and Review
MATE	MICOM Automated Test Equipment

MCS	Maintenance Control System
MICOM	US Army Missile Command
MICV	Mechanized Infantry Combat Vehicle
MISMAC	Missile Materiel Center, GS
MMCS	US Army Missile and Munitions Center and School
MOS	Military Occupational Specialty
MPFS	MACRIT Planning Factors Study
MRM	Maintenance Reporting and Management
MRR	Materiel Readiness Reporting
MSC	Military Sealift Command
MTBF	Mean Time Between Failures
MTD	Maintenance Task Demand
MTT	Mobile Training Teams
MWO	Modification Work Order

#### N

NCOES	Noncommissioned Officer Educational System
NIIN	National Item Identification Number

#### O

OCC&S	US Army Ordnance and Chemical Center and School
OPMS	Officer Personnel Management System
OT	Operational Test

#### P

PCB	Printed Circuit Board
PCBR	Printed Circuit Board Repair
PIP	Product Improvement Program
PLL	Prescribed Load List
PWIS	Prisoner of War Information System

#### Q

QMP	Qualitative Management Review
QMR	Qualitative Materiel Requirement
QMS	US Army Quartermaster School
QQPRI	Qualitative and Quantitative Personnel Requirements Information

#### R

RAM	Reliability, Availability, Maintainability
RASA	Realignment of Supply Activities
RC	Reserve Component
ROC	Required Operational Capability

S

SAAS	Standard Army Ammunition System
SAC	Supply Administration Center
SAG	Study Advisory Group
SAILS	Standard Army Intermediate Level System
SAMS	Standard Army Maintenance System
SCORES	Scenario Oriented Recurring Evaluation
SCP	System Change Package
SCR	System Change Request
SET	Systems Environment Test
SIDPERS	Standard Installation/Division Personnel System
SPBS	Standard Property Book System
SSEB	Source Selection Evaluation Board

T

TAC	Tactical Air Command
TACFIRE	Tactical Fire Direction System
TAMMS	The Army Maintenance Management System
TAS3	Transportation Aviation Supply Support System
TEA	Training Effectiveness Analysis
TEC	Training Extension Course
TECOM	Test and Evaluation Command
TI/QC	Technical Inspection/Quality Control
TMDE	Test Measurement and Diagnostic Equipment
TOD	Theater-Oriented Depot
TOS	Tactical Operations System
T2S2	Total Tank System Study

U

URS	Unit Reference Sheets
USASA	US Army Security Agency
UTTAS	Utility Tactical Transport Aircraft System

V

VIC	Visibility of Intransit Cargo
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W

WARPAC	Wartime Repair Parts Consumption Guide
WES	Waterways Experimental Station

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